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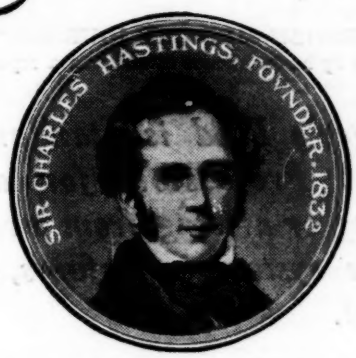

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DISCUSSION ON MEDICAL DIATHERMY.

OPENING PAPER

BY

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Medical diathermy is now being used by a considerably larger number of practitioners than was the case two or three years ago, and although the results which follow this form of treatment are possibly less quick and dramatic than those which follow surgical diathermy, they are no less valuable. Medical diathermy can, in fact, produce therapeutic results which no other form of treatment can effect. Little has been written, however, on the subject in the medical journals in this country, but I hope that we shall hear at the present meeting the experience of those who have been using diathermy for non-surgical purposes.

In opening the discussion I propose, first, to say a few words on the design of the present diathermy machines; second, to raise the question of the heating of the interior of the thorax and abdomen; and third, to bring before your notice certain morbid conditions for which the therapeutic properties of diathermy have been less used, although encouraging results have been obtained by certain workers at home and abroad.

With regard to the diathermy apparatus I feel that we need larger and more powerful machines. The machines at present made have often to be used "all out," and give their maximum output of current. This leaves no reserve of power for use on occasions when the sensitive part of the machine—the spark-gap—is not in its best possible condition, but cannot at the time be dissembled for cleaning. But the need for machines of greater power is more urgently felt when electrodes of large area are used. When these electrodes measure, say, 8 by 4 inches, the current density will be very low and the skin in contact with them will be only moderately heated. If, however, we wish to apply diathermy to the abdomen considerably larger electrodes must be used and the skin will be warmed very little, while the contents of the abdomen will probably, for reasons to be given later, undergo no rise of temperature.

The spark-gap also needs further improvement. The original type, working in air with the plates separated by mica washers, becomes too hot with long use, and the current applied to the patient diminishes to a small value. The width of the gap cannot be adjusted without dissembling the parts, and the mica washers are sometimes pierced by the sparks. Gaps in an atmosphere of coal gas do not overheat, and those which can be regulated while the machine is working are preferable. Soot, however, accumulates, and should be removed after the machine has been in operation for ten hours. It would be an improvement if the portions of metal between which the sparks pass could be detached and replaced from time to time. The surface becomes irregular and is gradually lost. I should like to learn the experience of those who have used gaps containing spirit. Does the gap overheat after some hours of continuous use, and does the metal unduly corrode?

When the diathermy current is directed through the abdomen it has little resistance to overcome. Its path is broad and its resistance low, while the abundant blood supply of the abdominal organs tends to conduct away the heat which is generated in them by the current. The statement that it is possible by means of the diathermy current to raise the temperature of any organ at any depth must be critically examined in the case of the abdominal and thoracic organs. On one occasion I placed a thermometer in a sinus that led to the region formerly occupied by the kidney, which had been removed for pyonephritis. The diathermy current was then passed antero-posteriorly through the abdomen along the region containing the bulb of the thermometer. Large electrodes, measuring 8 by 4 inches, were used, and a current of 1.2 ampères was passed for twenty minutes. Although the skin was made as hot as the patient could bear without discomfort the thermometer in the sinus showed no rise. In this connexion must be mentioned, however, certain experiments by Fürstenberg and Schemel. The diathermy current was passed antero-posteriorly through the abdomen, by way of electrodes measuring 8 by 12 inches, so as to include the stomach in its path. The temperature of the stomach was measured by a special instrument which was introduced into its interior. This contained a platinum spiral enclosed in quartz. The resistance of the spiral at different temperatures indicated the degree of heat in the interior of the stomach. The maximum rise obtained was 0.4° C. This was obtained with a current of 0.3 ampère. With a current of 2 ampères a rise of only 0.1° C. was obtained. This apparently paradoxical result was also obtained in animals. If the animal was afterwards killed and the circulation thereby stopped a stronger current produced a higher temperature. It is probable that in the living subject strong heating of the sensory nerve endings in the skin caused a reflex dilatation of the vessels of the stomach, so that the additional heat was more rapidly conducted away.

These results were obtained in normal subjects. In disease the conditions are different, and different results might be obtained. There is clinical evidence, to which I shall refer presently, which shows that diathermy is productive of good in certain morbid conditions of the abdomen. One certain conclusion can, however, be drawn —namely, that dosage is of extreme importance. It must not be assumed that the maximum current and maximum heat produce the best effects.

When the diathermy current is passed through a mucous membrane the relatively low resistance of the latter requires the application of a stronger current to procure the same degree of heat. On one occasion I applied diathermy to the prostate by way of an electrode placed in the rectum. The surface of application of the electrode was not more than one square inch, and although the machine was working at full power and gave a current of 2.5 ampères the patient said that he felt only moderate heat, and the thermometer indicated only 104° F.

I shall now speak on the uses of diathermy in certain diseases. One of these is that due to infection by the gonococcus, and as my co-worker, Dr. Robinson, will speak on this subject later I shall leave the description of the methods and results to him. I may say, however, that I first obtained an indication of the value of diathermy for the treatment of gonococcal infection in two cases of arthritis, in 1913. The results were so good that other cases of gonococcal arthritis were treated by the same method and, later, cases of similar infection of other parts. The treatment of such cases now forms a considerable part of the work of my department at St. Bartholomew's Hospital.

There are other diseases in which good results have been obtained by certain workers by means of diathermy, and I should like to hear the experience of any of those present to-day. Among these diseases may be mentioned angina pectoris. Those who have read Nagelschmidt's work on diathermy may remember the excellent results which he claimed in this disease; after courses of treatment some of the patients remained free from attacks for months or years. I have not had the opportunity of treating a case myself, but I remember one patient who suffered from arterio-sclerosis and precordial pain. The latter was at once relieved by the application of diathermy to the heart.

Bordier speaks highly of the value of diathermy for the treatment of cold paralysed limbs in anterior poliomyelitis. It is a valuable aid to electrical treatment, and the antagonists to the latter could not rationally object to it. The recovery from paralysis is greatly delayed by cold, and no method of heating is so effective as diathermy. I noted considerable improvement in the one case which I treated by diathermy for a period of three weeks. The treatment by diathermy of anterior poliomyelitis, in which the limbs are cold, is well worth full investigation.

Diathermy is, in my experience, most valuable in the treatment of the pain and spasms accompanying haemorrhoids. A case has recently been under my care at St. Bartholomew's Hospital. The patient complained of pain, bleeding, and the "coming down" of piles during defaecation, which he had to replace afterwards. After a course of diathermy, applied by means of a rectal electrode, the pain and bleeding disappeared. He said that something came down during defaecation, but only to a slight degree. He was examined by a surgeon with the proctoscope, but no haemorrhoids could be seen. If new fibrous tissue has formed in the pile it cannot be expected that diathermy will make it disappear, but the pain and discomfort can, in my experience, be permanently relieved.

Diathermy should be an efficient method of treatment of dysmenorrhoea by reason of its power to relieve congestion and painful spasmodic contraction. It is recommended by Bordier, and I believe that Dr. Turrell has obtained good results. The question of technique is one of importance. Bordier treated one case by placing one electrode in the vagina so that the metal end made contact with the cervix, the other being placed on the hypogastrium. By this method the uterus would receive a greater share of the diathermy than would be the case if both electrodes were placed on the skin, the vaginal electrode replaced by one on the buttocks or sacrum.

Diathermy should also be given a trial in cases of chronic para- and peri-metritis. I treated one case of parametritis before the war, and the patient derived some relief from pain, but did not continue the treatment.

A malady which is frequently seen in hospital electrical departments is coccygodynia. I see that Bordier, in his book, recommends diathermy for this condition. In my hands this treatment has not been very satisfactory.

Diathermy has been tried by a few workers in the United States and Germany for pulmonary tuberculosis. It has been said that in some cases the night-sweats had ceased, the temperature was lowered, and that the patients felt better and gained weight. If diathermy possesses therapeutic action in pulmonary tuberculosis the benefit derived is likely to be due to the increase of blood and lymph supply to the affected parts, and perhaps to the increased secretion of mucus, not to a direct germicidal action, because a temperature high enough for this purpose cannot be safely produced in the lungs. Nagelschmidt says that early cases only should be treated; if more advanced cases are treated there is a risk of increasing the haemoptysis.

I have refrained from speaking on the use of diathermy for the treatment of hypothermia, local and general, of neuritis, and of high blood pressure. Its value has been sufficiently established in these diseases.

In the subsequent discussion I trust that we shall hear the experience of others in the treatment not only of the diseases which I have mentioned, but also of others. Diathermy has established its position in therapeutics; it can cure or relieve some diseases for which other measures are unsuccessful. In other diseases in which simpler therapeutic methods are often successful diathermy has procured success in cases that resisted treatment.

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THE TREATMENT OF GONORRHOEAL AFFECTIONS BY DIATHERMY CURRENTS.

THE following is a brief account of some work which has been carried out on the treatment of gonorrhoeal affections by diathermy currents. Dr. Cumberbatch has mentioned the inception of the investigation by him before the war. It was taken up again after the armistice, and it is since then that I have been associated with it. All the earlier work and most of the later has been done in the Electrical Department of St. Bartholomew's Hospital, presided over by Dr. Cumberbatch.

In January, 1922, we made a communication to the Electro-Therapeutic Section of the Royal Society of Medicine, giving the results of treatments up to that time. Treatment of gonorrhoeal infection of the urethra in the male was undertaken last of all the regions on account of the fact that the work was started as an investigation into the treatment of gonorrhoeal rheumatism. It was natural, therefore, that cervicitis and urethritis in women and prostatitis in men should first receive attention after the joint affections.

The diathermy current was chosen because of the vulnerability of the gonococcus to heat and because by this means we can raise the temperature of the tissues concerned.

Growth of the gonococcus takes place in culture between 77° and 100.4° F. The optimum temperature for its growth is from 95° to 98.6° F. Exposure to 109° F. for seventy-six minutes, or to 111.2° F. for fifty-four minutes, or to 113° F. for thirty-seven minutes kills the organism. It is clear, then, that the gonococcus is less resistant to rises of temperature than most of the pathogenic organisms.

The foregoing observations, however, only apply to cultivations, and the temperature which is most suitable to its growth in living tissues is not known. Nor do we know the temperature to which it is necessary to heat it in order to kill it in these circumstances.

From the results of repeated observations it is clear that in the treatment of gonorrhoea by diathermy the effect produced is not due to the direct effects of heat alone. Gonorrhoea affecting the female urethra and cervix may be rapidly abolished, yet I have never been able to satisfy myself that the female urethra or cervix is heated above 112° F. during these treatments, and it is not necessary to heat it to this degree for longer than ten minutes. On the other hand, we have frequently heated the first two inches of the male urethra to this temperature for longer times without effect on the course of the disease.

From the results of observations on the effects of heat on cultures it follows that the two factors, temperature and time, must be taken into account in considering the direct lethal effect of heat. In living tissues there are the indirect effects of heat also to be considered. These indirect effects may be due to the effects of heat upon blood, upon the vessels, upon the mucus-producing cells, and upon other cellular activities. Indirect effects of heat may be present in laboratory experiments from chemical changes taking place in the culture medium on account of the heat, but it is doubtful if this will be so at the temperatures attained in these circumstances. If the indirect effects are absent it would account for the higher temperature and the greater time required to destroy under these conditions.

The fundamental results of raising the temperature of living tissues are not known. There are two factors to be considered—namely, the temperature attained and the time of the application. In dealing with living tissues the element of time is not so important as in the case of its application to cultures, because in the former reactions affecting blood and blood supply and other tissue reactions are set up after a short application and continue for some time afterwards. It is for this reason that a treatment lasting ten minutes or so may be as effective as one lasting half an hour.

Gonococcal infections of joints, of the cervix and urethra in females, and of the prostate and epididymis in males, are amenable to diathermy treatment because by this means these parts can be heated to a temperature which for gonococcus in these situations is lethal within the time of a treatment, when to the direct effect is added the secondary effects of heat and because this temperature is below that producing pain or destruction of the tissues concerned. In considering the temperature-time product in regard to the secondary effects of heat there is a minimum temperature which must be attained in order to get these effects and also a maximum beyond which they are again

lessened or abolished. There is, in fact, an optimum temperature. In regard to what this optimum temperature is, I have an idea that it is just short of 115° F. In raising the temperature of sensitive tissues a point is reached where the sensation of heat changes to one of pain, and this temperature is about 115° F. Speaking generally, the main object of pain is, I suppose, to prevent damage. So we may assume that any rise of temperature above that causing pain will be detrimental. In treating an insensitive part such as the cervix the temperature can be raised much above that causing pain in a sensitive part without causing destruction of tissues. But we have in the case of the cervix aimed at a temperature just short of that producing pain in the urethra on the assumption that there was an optimum temperature, that it was just short of that producing pain, and was in fact about 112° or 113° F.

It was at first thought that if, in addition to the gonococcus, other organisms were present it was unlikely that the heat produced by diathermy would have any influence on the latter. Later observations, however, seem to show that it will exert its action on other organisms as well as the gonococcus. Cases have occurred in which diathermy treatments applied to the cervix have cleared up a cervicitis and at the same time an arthritis which coexisted with it, when the gonococcus has not been found after repeated examinations. In these cases the arthritis has not been of that type usually associated with gonorrhoea, and it has been in patients in whom it was difficult to suspect gonorrhoeal infection.

After obtaining good results with the treatment in arthritis and epididymitis it was realized that after all not a great deal had been done if the original source of the infection remained active. The problem of treating the infection of the cervix and urethra in the female and the prostate in the male was therefore undertaken. Down to the present time, although quite a large number of cases of vaginal discharge due in all probability to gonorrhoea have been treated, there are only 18 who have come for treatment with a positive diagnosis of gonorrhoëa bacteriologically confirmed, either in the cervix or urethra or both, and in whom the result of treatment is shown by the result of bacteriological examination.

Of these 18 all were finally declared free except one. This case had four bi-weekly treatments, the first being on November 17th, 1919. On December 15th no gonococci could be found, also on January 6th, 1920, and February 16th, but on May 15th gonococci were again found in the cervix. She did not attend again, so that the final result was a positive bacteriological finding. Her husband had had gonorrhoea three times before marriage and the probability is that she was reinfected.

The other 17 cases were finally negative in both cervix and urethra: 13 of these received three to five bi-weekly treatments —that is to say, the course lasted over a period of one to two weeks. One of the 17 had six and one had nine treatments. Three of the 17 cases required many treatments. Two of these were due to reinfection, and their husbands were attending the treatment centre for gonorrhoea at the same time as we were treating them. One of them got a separation from her husband. Three treatments after the separation became effective she was declared free bacteriologically, and this result was subsequently confirmed. The husband of the other one was declared free from infection at the centre on June 9th. Our patient was found free on June 23rd, and this was confirmed on July 17th. The third of the three cases requiring many treatments was warded in the hospital during the whole time for which she was under treatment, and therefore reinfection was impossible. Diathermy was first applied to her cervix and urethra on April 1st, 1922, a current of 0.5 ampère being administered. On May 2nd gonococci were present in cervix and urethra. Treatments were continued, and on May 18th the urethra was found free, but gonococci were present in the cervix. The amount of current was now doubled and at the end of June the urethra contained no gonococci and the report of the cervical smear was that it was free from pus and no gonococci or other bacteria were found in it. The apparent resistance to diathermy was due to insufficient current being used in the earlier treatments.

No object will be gained by presenting the results of gonorrhoeal rheumatism by the statistical method, at all events at the present stage. We have done quite a large number now, varying from a mere arthralgia with no objective physical signs of arthritis to cases of the greatest severity, with almost complete destruction of the joints. The work includes treatment of inflammations of fibrous tissues and sciatic neuritis. In some cases the site of the infection has alone been treated, with good effects on the secondary inflammations. The response to treatment of cervix and urethra or prostate is so rapid in most cases that it seems likely that the arthritis is often a reaction to a toxaemia and not to an actual secondary bacterial invasion of the joints and other structures.

Although the action of diathermy to the site of infection and to joints and other local manifestations is immediate and invariable the ultimate restoration of the function of the joint depends upon the amount of destruction or the pathological changes which have taken place. The following two cases are taken to illustrate some of the points in the treatment of gonorrhoeal arthritis:

On March 30th, 1922, a female patient was admitted to hospital. The left elbow-joint had become swollen and painful a few days previously. On admission there was a tense swelling of the soft parts extending a short distance above and below the joint, giving the appearance of acute suppuration. Movement was extremely painful, and the joint was almost fixed in a flexed and pronated position. An application of diathermy was given. On April 4th the swelling of the soft parts had almost subsided, she was sleeping fairly well, and movement of the joint though still very limited was less painful. Smears from cervix and urethra showed a small number of gonococci. A course of diathermy was then given to the urethra and cervix. At the end of June there was almost complete flexion and extension of the elbow-joint and pronation and supination were complete. There was no pain or swelling and the general condition of the patient was good. The cervical and urethral smears were free from gonococci and other bacteria. During the later period of the treatment she had sinusoidal alternating current applications with massage and movements, and in about three months from the commencement of treatment complete functional restoration of the joint resulted.

On June 4th, 1923, a male patient was admitted to hospital with pain and swelling of joints of five weeks' duration. He had had gonorrhoeal urethritis in France in 1917. The right knee was swollen, painful, tender, and hot, and was almost fixed in the extended position. The right shoulder was painful and fixed. He was febrile, and his general condition was bad. Rest at night was much disturbed by pain and he was confined to bed. *X*-ray examination showed a septic arthritis without cartilage absorption or new bone formation. He had four bi-weekly applications of diathermy to the prostate, with the result that the pain was relieved. Subsequently he had applications to the knee and shoulder. On July 9th he was free from pain, his general condition was good, and he was able to walk fairly well. There was still some stiffness of the knee and shoulders, but I anticipate in a short time to get complete functional restoration of the joints in view of the absence of loss of cartilage and new bone formation, as shown by *x* rays.

In considering the effects of diathermy on the prostate we have had to reply upon the results as they affect the secondary manifestations rather than upon bacteriological findings. We have, however, had cases in which a positive bacteriological diagnosis has been made previous to the commencement of the treatments and in which no gonococci have been found afterwards.

The following case serves to show the effect of treating the prostate:

The case was one of severe sciatica with great pain preventing sleep at night. There was a history of gonorrhoea and a stricture of the urethra with a fistula immediately behind it. Other remedies having failed to relieve the pain, he was presented for electrical treatment. Diathermy was applied to the prostate, with the result that the sciatic pain began immediately to subside and in one month had nearly disappeared. The patient made a good recovery, being able to walk without pain, though stooping with the knees extended continued to cause slight pain down the legs.

The following is a case of arthritis associated with increased frequency of micturition, treated by applying diathermy to the prostate:

The patient had had pains in the knees for seven weeks. The joints were slightly swollen and he was able to walk only with the help of a stick. He passed water three or four times at night. Diathermy was applied twice a week to the prostate for two weeks. The pain in the knees disappeared, movement became painless, and there was no nocturnal micturition.

The results of diathermy treatment of gonorrhoeal epididymitis are very constant. Most of the cases have been mild with slight swelling, but some have been severe with great swelling of the scrotum and its contents, accompanied by pain, and extremely tender to the touch. In a few cases the cord has been swollen. Pain and tenderness have been invariably reduced by the first treatment, and three treatments have with one exception been sufficient in all cases to abolish pain and tenderness and reduce the swelling to a slight hard enlargement of the epididymis. The exception was a case of chronic inflammation of the epididymis

and vas, which produced a condition somewhat like tuberculosis of the testicle. After two months' treatment of this case recovery was complete except for slight enlargement of the epididymis.

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DIATHERMY IN HIGH BLOOD PRESSURE AND OTHER CONDITIONS.

DR. CUMBERBATCH has said that he refrained from speaking on the use of diathermy in the treatment of high blood pressure, because, he said in a spirit of fine optimism, its value had been sufficiently established in this disease. It may be so to the few in the profession, but I am afraid that to the many diathermy has a position far removed from established, and it is our duty as electro-therapeutists, who have proved its value, to preach its value to the profession until it *is* established; hence these words. Even that brilliant master, Clifford Allbutt, whose work in blood pressure is classical, hardly recognized electricity in the treatment of it at all. He it was who, I believe, introduced the term "hyperpiesia," by which he indicated an insidious rise in arterial blood pressure occurring in middle or late middle life, which is curable, or at any rate capable of being held in check; but if allowed to progress untreated surely leads to arterio-sclerosis and to all the evils that follow in the train of this pathological change, to premature senility, and early death.

In the condition of high arterial tension medical diathermy is of peculiar service, and patients may be treated with confidence and kept in a state of safety. If the hyperpiesia be recognized early, then the treatment with diathermy is effective inasmuch as we may reasonably hope to prevent the otherwise inevitable consequence. And even when arterio-sclerosis has become an accomplished fact this method of treatment will stay the process and avoid the cerebral haemorrhage or other of the serious sequelae to which the arterio-sclerotic is slowly but surely progressing.

High blood pressure, especially in the pre-sclerotic state, may exist without any signs or symptoms, or with these so vague as to be rarely recognizable by the patient, and may, indeed, be only discovered by the sphygmomanometric reading. There may, however, be certain functional symptoms, such as attacks of transient giddiness, a heavy oppressive fullness in the head, headache often intensified with effort or mental concentration ("the sign of painful thought"), or the headache may be pulsatile in character; there may be insomnia or drowsiness, especially in the morning, with a disinclination to work and an inability to concentrate the attention, alternating, perhaps, with an irritability of temper and occasionally with a mild psychic exaltation with a confusion of ideas; failure of memory, noises in the ears, migraine or neuralgia, general nervousness, with anxiety or a sense of impending evil impossible to define. Thus it seems that high blood pressure may evidence itself in a variety of ways, none of them pathognomonic, but they usually occur grouped together in such a way as to suggest collectively an altered blood pressure.

Here we have a condition in which medical diathermy can accomplish much. Pathologically there may exist a process of degeneration which we can check and so prevent arterio-sclerosis and ward off such imminent consequences as apoplexy, kidney affections, and the myriad ills that are associated with this condition. With this form of treatment, except in the very advanced cases, a patient can be kept for years in a condition of safety, judicious attention, of course, being paid to general outlines of alimentation and exercise and possibly intestinal disinfection.

The therapeutics of this current in lowering the blood pressure are twofold. One, the general or constitutional effect as affecting metabolism; and the other the local effect on the vasomotor system. The general effects of the current as influencing metabolism have been demonstrated both clinically and chemically. Clinically there is a gain in physical and mental strength and general improvement in the health and the symptoms involved. The insomnia, palpitation, anxious fears, or whatever may be the subjective trouble, disappears. Chemically there is an increase of solids in the urine, and a similar increase has also been found on analysis of the perspiration. The improvement in general metabolism is probably largely due to the effect on the vasomotor system, whereby the arteries becoming relaxed permit of a more free circulation of the blood, and if this one fact be granted then the beneficial effects of the current are easily explained. A subsidiary cause may be at work, and that is the thermic effect of the current. This is quite apparent to the patient, and it may be that this causes an increase of functional activity by which the elimination of the toxic materials is augmented.

The apparatus from which I have been deriving the current varies a little, perhaps, from the form generally used (though one enterprising firm of instrument-makers has copied it in certain particulars). The high potential current is conducted through a multiple spark-gap, two condensers and a copper solenoid. The particular arrangement that I have found most successful and one capable of giving up to 2,500 milliampères by the auto-condensation method may be thus described:

The current is led from the direct main in the ordinary way through a switchboard to a 12-inch coil, the switchboard being provided with a voltmeter and ammeter, knife cut-out, and three resistances—of the latter one controlling the speed of the interrupter and the other two regulating the strength of the current. From the coil the current is led into a multiple spark-gap, choke-coils being intercalated. From the spark-gap it is led to two insulated condensers having a capacity of 0.002 M.F.D. Thence it is led to an adjustable inductance resonator of copper wire (4 B.W.G.) having twenty-eight turns; from this to one terminal attached to a sheet of metal 18 by 68 inches and to the other terminal ending in a handle, with a milliampèremeter in circuit. The spark-gap is one of the simplest possible type. There are nine gaps, each measuring 2 mm. The sparks are discharged unmuffled in the open air, but owing to the extreme shortness of the sparks and the multiplicity of them the noise is much less than the ordinary high frequency spark. The current can also be derived from the static machine and applied by means of the auto-condensation cage and auto-condensation couch, and will give equally good results. The two forms are much alike in principle.

Comparatively young people grow old before their time. This is often due to the manner of life led. Excessive eating or drinking, brain work and worry tend, as we have seen, to raise the blood pressure, pave the way for hyperpiesia and arterio-sclerosis, and are the means of hastening the patient to a premature grave. But if a mode of life conducive to a healthy old age be adopted, auto-condensation used when the pressure shows signs of rising, arteries may be kept elastic and youthful, and man will then be as young as diathermy makes his arteries.

The importance of a treatment which is able to lower a high arterial tension can hardly be overestimated. If we can hope to keep the arteries "young," help to ward off mental disturbances in neurasthenics, diminish the chances of an unfavourable end to a case of nephritis, or to forestall an attack of apoplexy by any agent, that agent is worthy of grave consideration. Among other conditions in which this current may be used with advantage are pneumonia, tuberculosis, both of chest and joints, gout, anaemia, in wasting diseases, and when superalimentation is indicated. I will touch briefly on the first two of these.

Medical diathermy has been used in the treatment of pneumonia in the United States, generally in the service of the United States Hospital Marine, which service, I may remark parenthetically, is one of the best medical services of any country I have yet visited. The current used varies from 500 to 1,000 milliampères. The plates measure about 3 by 5 inches, and one is placed on the back and one on the front of the congested area. With the heat applied directly through the pneumonic patch a dilatation of the vessels and consequently a decongestion takes place. The increase in temperature is beneficial probably because it exercises a deleterious effect upon the bacilli causing the disease. It was generally taught when I was a student that the temperature in pneumonia was an effort on Nature's part to kill the bacillus, which thrives best at the normal body temperature. If, therefore, we can increase the temperature and thus directly aid Nature in harming the bacillus this may be an additional way in

which this current acts beneficially in pneumonia. Be this as it may, at any rate a few treatments appear to cause a rapid amelioration of the symptoms; notably the breathing becomes easier and cyanosis lessens, indicating that increased air absorption by the lungs is taking place, and the heart is better able to perform its functions owing to the diminished resistance in the pulmonary circulation.

Dr. Cumberbatch touched briefly on pulmonary tuberculosis and in this I cannot help feeling that medical diathermy has a future, again owing to the fact that it causes a rise of temperature in the tissues through which the current passes. It may be true also in this condition that the rise in temperature inhibits the growth of the bacillus and possibly, without having a direct germicidal action, as Dr. Cumberbatch observed, tends to weaken if not destroy it. Certainly the local increase in temperature with the resultant improvement in the circulation and lymph flow favours phagocytosis, metabolism is more active, toxins are eliminated, and with the diminished fighting power of the bacillus and the increased resistant power of the body the current assists to a return of a normal condition of the tuberculous areas.

The details of the application will be evident to anyone accustomed to this method of treatment, and it certainly should not be used by any other. The duration of treatment should be from twenty to forty minutes, beginning with the shorter time and gradually increasing. Applications should be given daily until there is an amelioration of symptoms, when they may be reduced to alternate days.

This method of treatment is deserving of a fair trial and it would certainly seem to offer symptomatic relief and possibly a chance of a radical cure. Other countries, as Dr. Cumberbatch said, are trying it, but in so important and urgent a matter as the treatment of tuberculosis by electricity why should other countries lead? Why should not the country in the forefront be England?

GENERAL DISCUSSION.

Dr. W. J. Turrell (Oxford), a Vice-President of the Section, who occupied the chair during this discussion, said that he was in entire agreement with Dr. Cumberbatch with regard to the unsuitability of the mica spark-gap for prolonged or continuous or intensive treatments. He started with a spark-gap of this kind in 1912, and used it still, but only for light treatments. With regard to the amount of current possible with these machines, he had found the Gaiffe gave an ample amount—say 2½ to 3 ampères. But the success of diathermy treatments depended on the duration of the treatment, and not on its intensity; 2½ ampères for an hour, he thought, was sufficient for any ordinary medical treatment. Dr. Cumberbatch had stated that with the big pads more was needed, but, then, with the big pads the resistance was lowered and more current was got through. With regard to one of the chief points in Dr. Cumberbatch's paper, that of the heating of the abdominal organs, the speaker believed that any organ of the body might be heated to any desired extent. But with what object was medical diathermy given? Not simply with a view to converting electrical energy into heat energy within the tissues, but to obtaining the consecutive effects of that heat in the tissues, and if those consecutive effects in the shape of dilatation of the vessels and relaxation of spasm were produced the organs of the abdomen were heated to the desired extent. As far back as 1911 it had been shown by experiments on animals that practically every organ in the body could be heated by diathermy. The experiment of Fürstenberg and Schemel, mentioned by Dr. Cumberbatch, showed that when 300 milliampères were administered the temperature of the stomach rose half a degree above normal. But when this current was increased to 3 ampères, the temperature of that organ registered only one-third of a degree above normal, showing that with the larger current the heat-regulating centre was called into relatively more action than with a smaller current. The way to look at the question was to study the mode of action of diathermy and how it would apply to the particular case under treatment. Would a case of spasmodic dysmenorrhoea, for instance, be relieved by the relaxation of spasm, and could this relaxation of spasm be brought about by diathermy? In a case of unresolved pneumonic lung, would resolution be helped by an increased blood supply, and could this be brought about by diathermy? That was the scientific way of dealing with the action of diathermy, and if it were looked at in that way it would be seen over what a very wide range of disease diathermy could give relief, and that no general ward, medical or surgical, was complete unless it had available the services of diathermy. He quite agreed with Dr. Cumberbatch as to the benefit of diathermy in the treatment of haemorrhoids of the non-surgical type. The relief afforded remained for one, two, or three years. In dysmenorrhoea diathermy should be given for about three days before the period. With a pad in front and a pad behind, 20 by 10 cm., about 2 ampères should be given for about ten minutes on each side. It was not the uterus it was desired to heat up, but it was the tissues round about the ovaries. In coccygodynia very good results indeed had occurred in hospital treatment—about 75 per cent. of cures. If there was a simple congested condition causing pain, diathermy would relieve it; if it had passed on to a more fibrotic condition, the *x* rays would have to be called in. Dr. Robinson was to be congratulated most heartily on the careful work he had done. Indeed, this very thorough investigation of the action of this treatment on gonorrhoea was a matter on which all in the Electrical Department of St. Bartholomew's were to be congratulated. With regard to high blood pressure, he admitted that the blood pressure could be reduced by diathermy, but it could be reduced also by a hot bath, and a hot bath was the less expensive treatment. Wherever possible, the simpler rather than the more complicated treatment should be adopted. Would diathermy do such cases any good or any harm? That, indeed, was the question to be asked with regard to all these cases. They should go round the general wards of the hospital and watch the cases, and ask themselves in each case whether diathermy would be of use in that case. He thought they would find that there were few cases in which diathermy would not be of use. One very intractable condition in which he had been using diathermy with success lately was rheumatoid arthritis of the hip. He gave the treatment once a week, though at the beginning the sittings were rather more frequent. Administered at intervals of one week, the patient did not get tired of the treatment, and after each sitting movements and massage should be practised. The treatment must be carried on for a long period, even up to one year. Large pads over each hip should be applied and 2 ampères administered for an hour. Big pads were used, reaching from the side of the body down the thigh and leg, and the heating took place through the hips.

Dr. G. B. Batten (London) drew attention to the very valuable paper read recently before the Electro-Therapeutic Section of the Royal Society of Medicine by Dr. Phillipson of Brussels. This worker had done a number of experiments to measure the passage of currents through various kinds of living tissue, and he found that the current which could be measured through a cubic centimetre of potato, for instance, or the liver of a guinea-pig, was soon rendered very small in the case of the constant or the sinusoidal current, and was practically very little in the case of the faradic current, but that in the case of high frequency and diathermy currents a definite amount of current was found to go through the tissue, and this was increased enormously with the frequency. If, with the higher frequencies, a very much greater proportion of current went through the tissue cells, it was most important that the diathermic machines should be such as gave a sufficiently high frequency. With the ordinary high frequency machine—whether the single spark-gap or the multiple spark-gap, which latter Dr. Howard Humphris helped to introduce, and which was much better than the single—a very high frequency was quite easily obtained. It was not the output in ampères that was important, but the amount of current which would go through the cells of the body, and this depended simply on the frequency. To obtain good effects the frequency per second of the machine

must be sufficiently high, and this meant that the condensers must not be too big. He wished also to say that diathermy and intensive high frequency did have a definite effect upon the growth of bacteria. Twenty-five years ago he conducted a series of experiments with a bacteriologist on the growth of the diphtheria bacillus, and by putting the test tube into the solenoid through which the high frequency current was passing it was evident what an influence the current had on the growth of bacteria, and it might help the growth of bacteria in the body in the same way. Next, Dr. Robinson had pointed out that in gonorrhoeal arthritis, say of the elbow-joint, it was better to treat the source of the poison. There were a very large number of distressing cases of chronic blood poisonings, perhaps of the rheumatic type. Many cases of this kind were due to septic infection of the tonsils, which could be dealt with by surgical means, but there were a series of most distressing cases in which blood poisoning was due to haemolytic streptococci entering the tonsils, and the tonsils were very small and could not be removed, at least without a good deal of haemorrhage. There were a certain number of cases in which tonsillectomy could not be practised. Was there any possibility of surgical diathermy being applied to the tonsil in such cases, to get rid of the focus of infection? The question of high blood pressure was a very difficult one; he quite agreed with Dr. Turrell that very often the patient might be made worse by altering the blood pressure. On the other hand, high blood pressure did mean a state of danger, and if people could be kept below that danger limit their lives would be prolonged. To bring the pressure down too much in an artificial way was to do harm, but there was surely some carefully adjusted method which would be useful. In most cases of increased high blood pressure there was interstitial nephritis. Dr. Howard Humphris had said that general diathermic treatment would increase the elimination of waste products. If that was the case it ought to be followed. In conclusion he referred to the treatment of haemorrhoids by intensive high frequency, a method of treatment he had carried out for twenty-five years, and the more he used it the better he liked it. He had had many cases come back after four, five, or six years with a request for another set of treatments, and the patients had told him that the course he had given them previously had ensured their comfort until then. He usually gave twenty minutes' treatment on a condenser couch for two or three times. The same thing applied to simple congested prostates.

Dr. C. B. HEALD (London) said that the headings furnished by Dr. Cumberbatch provided an excellent basis for discussion, and he proposed following these in the remarks he had to make. With regard to what Dr. Cumberbatch had said about machines, he was convinced that this suggestion for removable ends in the spark-gap was both useful and practical, nor should there be any difficulty in manufacture. He would like to ask Dr. Russ whether anything could be done to prevent sooting up of the spark-gaps; his impression was that this sooting took place more rapidly with some samples of gas. Under his heading of "deep heating" Dr. Cumberbatch had described certain paradoxical effects. The speaker's own clinical experience had taught him that in using diathermy, especially for deep-seated organs, it was not a question of how much current could be brought to bear but of the most suitable quantity and technique. Indeed, he now felt certain that if diathermy was used when acute lymphangitis was present it was essential that small currents and long times should be employed. Dr. Cumberbatch had asked for their experiences in certain special diseases, and he would like to deal particularly with three. With regard to gonorrhoea, he had had the pleasure of receiving instruction from Dr. Robinson in his methods, and so impressed was he of the value of these that he had adopted them as a routine practice at his hospital. He would, however, like to ask him whether in his diathermic treatment of the epididymis he had ever produced sterility or prevented this most common sequel of a gonorrhoeal affection of this organ. He also agreed with him as to the necessity of treating the primary focus in all cases of gonorrhoeal arthritis. With regard to cold limbs and poliomyelitis, he had a paper on this subject in course of preparation, but he could say there without entering into too great detail that he had met with most remarkable and uniform success, and that if the current was employed by a technique he had elaborated improvement took place even in cases of very long standing. One case he had under treatment at the present time was showing rapid and remarkable progress, although there was a previous history of twelve years without improvement. In lung cases some of the remarkable effects he had seen from the use of the diathermic current and its cousin, the vacuum electrode, could not be accounted for entirely by the heating effect and required further research. Passing to one or two points outside Dr. Cumberbatch's paper, he had been particularly struck by a remark by one of the previous speakers that "Other remedies having failed, the case was presented for electrical treatment." This, unfortunately, was often too true, and the great value that electrical treatment could have in the early or acute stages of disease was too little known or realized. This, however, was their fault as electro-therapeutists, and it was up to them to educate, by convincing scientific proof, their medical colleagues. The first step in this education must be to prove to them that diathermy not only did not irritate or stimulate when properly applied, but was soothing and sedative. When, however, such a great authority as Sir Robert Jones categorically stated that any form of electrical treatment in the early stages of poliomyelitis was actually harmful, it necessarily followed that cases in the early stage of that disease were rarely referred to the electro-therapeutist. The speaker, however, had no hesitation in saying that not only would these children benefit by the early application of diathermy, but a material lessening of the crippling effects of the infection might be expected. He thought there was need for scientific investigation of the question whether diathermy did not act also in some manner that was not entirely due to the heating effects of the current. He was, therefore, particularly glad to hear Dr. Batten's observations on Professor Phillipson's recent paper. Finally, he wished to agree most strongly with Dr. Turrell's remarks on the necessity for viewing each case from the physiological and pathological standpoint before any course of electrical treatment was embarked upon. It was in these respects that the non-medically qualified people who used electrical currents were liable to bring the science of electro-therapeutics into danger.

Professor SIDNEY RUSS (Middlesex Hospital) said that, knowing Dr. Cumberbatch as an experimentalist, he rather expected to hear him say that he would like a machine which would give him a bigger range not so much of output as of frequency of oscillation. That was where expansion was required, and if that was secured it would help to clear up one or two points touched upon lightly during the discussion. The heating effect of the diathermy current was, of course, the main reason for its use. Had Dr. Cumberbatch in any cases seen favourable results by the use of the diathermy current when he had reason to suppose that the rise of temperature was insignificant? If so, then the question arose, to what were the results due? It was well known that with this frequency of oscillation practically all ionic movement could be cut out. An oscillating magnetic flux was associated with this current. So far as the speaker knew, there were very few instances in which the oscillations of a magnetic field had any physiological response. The only one which had been demonstrated to the physicist's satisfaction was the experiment of Professor Silvanus Thompson in which there was an effect on the sensation of vision. Here a kind of magnetic flicker went on. If physiological effects were to be observed with these currents with an insignificant rise in temperature he would like to know to what cause the electro-therapeutist attributed them. The ordinary laws of resistance all broke down in the case of these oscillations. It would be very difficult to predict the effect even with metals, and in going through the human body where a passage was made not only from one kind of tissue to another but from solids to gases, he did not wonder that irregularities occurred. He imagined it would be very difficult to predict what the

distribution of temperature would be. He did not know whether experimentalists had found it worth while to make any sort of estimate of the way in which the current went. It by no means followed that over large areas covered by electrodes there was an even distribution of the current throughout. He remarked upon the tendency of those practising diathermy to talk about dosage and how the effects of diathermy depended not only on the current but on the time. He thought the effects would also be found to depend on the current density. The question was, how did this current density have its effect? As in every other physical problem, the rise of temperature was dependent not only upon the amount of heat produced along the particular "cylinder," but upon the opportunity which allowed that heat to escape. He thought it might be well worth while for the experimentalists to vary the current density, and once they had arrived at a certain current density to see how the subsequent rise of temperature was modified by the size of the electrode.

Dr. AGNES SAVILL (London) recited her experiences of local diathermy for the treatment of gonorrhoea in women. As long ago as 1911 she treated a case of gonorrhoea, having profuse discharge from the cervix, by Sloan's method of local ionization with copper. In those days she gave too small doses, and hence the cure was delayed and the result took longer to bring about. That patient, however, was cured, and had a perfectly healthy child within a year. Within the last year she had had two cases in her private practice in which profuse gonorrhoeal discharge responded well to a treatment of combined ionization and diathermy.

(1) Mrs. A. had had profuse discharge for five months. She had been curetted and treated by a skilled surgeon. As his skilled methods had not succeeded in removing the gonococcus, he sent her on to the speaker to see what electricity could do. She saw the patient first on January 26th, 1922; the patulous large cervix was full of thick mucous discharge and the womb much enlarged. On that date and on five subsequent dates up to February 20th zinc was applied to the whole womb, 30 milliampères for eighteen minutes. The womb by that date was reduced to normal size, but there was still a considerable degree of mucous discharge. Diathermy was commenced on February 24th and administered also on March 1st and 6th. A copper electrode was passed to the top of the womb and 1 ampère given for ten or twelve minutes. Immediate improvement set in. On March 16th the bacteriological report for the first time was negative. She saw her a year later; there had been no relapse.

(2) A patient who had had considerable treatment for nearly eighteen months came to her in July, 1922. She gave diathermy on July 14th, 17th, and 27th to the cervix only, 1/2 ampère for eight minutes on the first two occasions, and on the third 0.8 ampère for fifteen minutes. The copper electrode fitted into the cervix, and had a small projecting flange externally. She wrapped it round with a thin layer of wool, soaked in salted water. The discharge at once was much diminished. During the treatment the patient said there was a sensation of throbbing internally, but no pain. The slight remaining discharge was treated on five occasions in September and October with zinc ionization. The speaker saw the patient a year later, and there had been no relapse.

Dr. FLORENCE STONEY (Bournemouth) asked whether diathermy had been found altogether satisfactory for the treatment of chilblains. In her experience cases did well for the moment, but the condition recurred, simply because the original cause had not been tackled. Those who practised diathermy were hampered by getting only end-results in a great many cases. With regard to the tonsillar infection mentioned by a previous speaker, she did not think it necessary to remove the tonsils surgically because with the ultra-violet treatment the condition could be dealt with without so much discomfort to the patient.

Mr. DAVID LEES (Edinburgh) said he had listened with great interest to the papers, and especially to that of Dr. Robinson, and he would like to congratulate him on the results which he had obtained by diathermy in chronic gonococcal infections. Such results could only be obtained by very careful technique and close personal attention to detail. In his remarks on the cases of endocervicitis, what impressed one was the very small percentage, 18 out of 120, of cases in which positive bacteriological evidence was found. He would like to ask him if the discharges before commencing treatment were examined by culture and if the blood of all these cases was examined by complement fixation test, as, if not, these methods might possibly improve his figures and give more definite diagnostic information. In the three cases of cervical infection which he quoted as being specially resistant, was it not possible that the recrudescence of the disease was due to tubal and uterine infection which the deep heat had not reached, rather than to extraneous reinfection? In discussing the cases of arthritis, Dr. Robinson had stated that the joint condition was chiefly a toxaemia. While this was so in the arthralgias he (Mr. Lees) could not agree that this was true of the great majority of gonococcal joint conditions, as in many of the acute cases it was possible to isolate the gonococcus from the lining membrane. It was difficult on this account to see how treatment of the original focus only in the cervix or in the prostate was so effective in clearing up the metastatic lesion. Another point which he would like to inquire into was how the local application of diathermy to the prostate cleared up the condition, when it was a recognized fact that the posterior urethra was always involved in these cases, and yet the speaker admitted that the results of diathermy in anterior and posterior urethritis were disappointing. One could quite appreciate how diathermy would act well in epididymitis, but it was quite unusual for this condition not to subside in less than two weeks with much simpler methods of therapy. From the statement of Dr. Cumberbatch that diathermy did not irritate but acted as a mild sedative one would be inclined to think that the field for its use would be greatest in such gross cases as prostatic abscess or vesiculitis associated with frequency of micturition or retention of urine—in cases, say, of salpingitis, and in cases of ophthalmia neonatorum. Had Dr. Robinson tried it in such acute cases, and what had his results been in those cases in which he had tried it? If in these acute processes the application of deep heating to the tissues would kill the gonococcus then it would be a most useful method of handling them before the tissues were destroyed and before other and more resistant organisms complicated the lesions. In chronic fibrotic processes such as chronic prostatitis with closed-in foci of infection it was difficult to be convinced that heat alone would cure the condition, and that applications to the original focus alone would cure the metastatic infection in a joint. As several speakers had mentioned, there must be other factors in the curative process than the heat alone. Before pronouncing judgement he intended to try the methods of Dr. Robinson in both acute and chronic conditions at the earliest opportunity. While the results reported were excellent, it was as yet difficult to be convinced that in diathermy they had a more effective means of clearing up the infection than the present routine methods. The methods outlined by him merited a thorough trial.

OPENERS' REPLIES.

Dr. ROBINSON, in replying on the discussion, said that he had had one case of salpingitis with very definite infection of the cervix, and he had continued to treat that case by the ordinary methods of treatment of the cervix, and eventually the salpingitis cleared up. He had not had occasion to treat an acute case of prostatitis with retention of urine and so on.

Dr. CUMBERBATCH, in his reply, thought there was a danger of regarding high blood pressure as a disease, whereas it was only a symptom. With regard to pneumonia, Grover, in the United States, mentioned very good results following diathermy, particularly in cases of unresolved lysis of the lung. The speaker was bound to say, however, that he looked upon such claims with some suspicion, particularly when he observed the mistakes in other directions, such as physics and technique, in the book in which they appeared. With regard to the rate of oscillation of the current, this was a very important matter indeed, to which Professor Phillipson had referred in his paper before the Royal Society of Medicine. From the work which Phillipson had done it appeared that the rate

of oscillation of the current played an important part in the distribution through the tissues. In the case of tonsil infection, mentioned by Dr. Batten, he would suggest the excision of the tonsils by means of the diathermy knife electrode. He was cordially in agreement with Professor Russ on the point that when cases were described not only the strength of the current but its density should be mentioned. With regard to Dr. Stoney's remarks, chilblains would be removed by applications of diathermy, but if the cause of chilblains still remained they would recur.

SECTION OF DISEASES OF CHILDREN.

EDMUND CAUTLEY, M.D., F.R.C.P., President.

DISCUSSION ON ACIDOSIS AND ALKALOSIS IN CHILDREN.

OPENING PAPER

BY

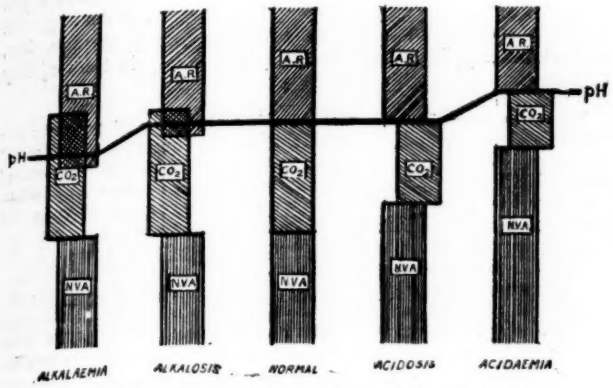
P. J. CAMMIDGE, M.D.LOND.

BEFORE we can profitably discuss acidosis and alkalosis it is essential that we should have a clear conception of what we mean by the terms, as they are frequently employed by clinicians and laboratory workers in different senses. The theory of acidosis was introduced into medicine to explain diabetic coma, which it was believed arose from the presence in the blood of abnormal acid products of metabolism, notably beta-hydroxybutyric acid, in an unneutralized condition. Since this substance was found to be excreted in the urine along with acetone and aceto-acetic acid, acetonuria came to be looked upon as an index of acidosis, and the terms are still regarded as synonymous by some clinicians; it will save possible difficulties, however, if we agree to refer to this condition simply as acetonuria, or, better, ketonuria. Subsequently means were sought by which the degree of acidosis could be easily determined, and, as direct measurement of the acid products proved impracticable, reliance was placed upon an increased elimination of ammonia by the kidneys. Such an increase usually takes place when there is an undue formation of acid products in the metabolic cycle, but, as it was found that the acids are not necessarily of the group referred to, acidosis with, and without, ketonuria were eventually recognized. At a later date, when the essential characters of acids and bases had been worked out and new and more delicate methods of blood analysis were developed, the subject was investigated from a fresh point of view. At first it was hoped that determination of the acetone content of the blood would be helpful, but it proved a fallacious guide. The same was found to be the case with the titratable reaction, which, it was shown, undergoes very slight alteration in even the most severe forms of clinical acidosis; in fact, so carefully is the reaction of the blood regulated that it has been suggested by Hawk[1] that a change equivalent to the very slight difference between the reaction of tap water and distilled water might prove fatal. In the light of this discovery the old idea of acidosis, in the sense that the symptoms associated with it are dependent upon the presence of unneutralized acid products of abnormal metabolism in the blood, had to be abandoned and replaced by a new conception.

In order to obtain a clear understanding of the views which now arose it is necessary we should briefly consider the mechanism by which the normal, faintly alkaline reaction of the blood is maintained. It is essentially a physico-chemical process, depending upon the interaction of alkalis with acids, of which carbonic and phosphoric acids are the most important. Weak acids such as these possess the interesting property of maintaining the reaction of the fluid in which they occur at a practically constant value if an excess of their salts is also present; any added acid or alkali is, as it were, soaked up, hence they are known as "buffer substances." Owing to the presence of substances of this character in the blood considerable quantities of acid or alkali can be dealt with without any alteration taking place in its reaction, and if the mechanism for renewing the supply and removing the products formed is working efficiently, the process can continue indefinitely. In ordinary circumstances the necessary supplies are derived from the food. On a mixed diet there is a tendency towards the constant production of an excess of acid radicals, which are, however, oxidized or neutralized and then eliminated, the organic acids being converted into carbon dioxide, and the mineral acids combined with ammonia, when a sufficiency of bases coming from the food is not available, or with colloids, the amphoteric nature of which enables them to take up a considerable amount of acid or base without altering their reaction. Removal of the end-products produced in this way is effected by the lungs, through which carbon dioxide is eliminated; by the kidneys, which excrete most of the fixed acids; and by way of the intestine, through which some of the phosphoric acid passes out from the body. Very little is known of the part the intestine plays in regulating the reaction of the blood and tissues, although it is probably more important than is generally supposed. The efficient functioning of the kidneys is a cardinal factor, but their influence is exerted comparatively slowly and the amount of acid derivatives they can excrete is not large relatively to the quantity calling for removal in some pathological conditions. The most important regulating mechanism for rapidly controlling temporary variations is the excretion of carbon dioxide by the lungs.

When the entrance of acid products into the circulation disturbs the equilibrium existing there between the carbonic acid and bicarbonates, by decomposing some of the latter and producing a relative excess of carbonic acid, the increased acidity which would result is prevented by the sensitiveness of the respiratory centre to changes of reaction in the blood. It at once speeds up pulmonary ventilation and thus eliminates carbonic acid until its original ratio to the bicarbonates is restored, but, as there is less bicarbonate than before, the proportion of carbonic acid will also be lower and remain so until the destroyed bicarbonate has been replaced from the alkaline reserves of the body. In a healthy individual this is quickly accomplished, and the alkaline reserve is replenished from the bases contained in the food; but when, as may happen under pathological conditions, large amounts of acid are continually entering the circulation, the supply may not be equal to the demand. The alkaline reserve is then gradually depleted, the proportion of bicarbonate in the blood is permanently diminished, and there is a corresponding reduction in its capacity to transport carbon dioxide, which consequently accumulates in the tissues, giving rise to the subjective symptoms of suffocation, with hyperpnoea or air hunger, followed eventually by death when the exhaustion of the alkaline reserve is sufficiently extreme. According to modern views, therefore, the cardinal feature of acidosis is not an excessive production or accumulation of acid in the body, but a diminution of the reserve supply of alkali-yielding substances arising from the attempt to prevent acids appearing in the circulation as such; and since the proportion of bicarbonate in the blood represents the excess of bases left, after all the fixed acid has been neutralized, acidosis has been defined as "a condition in which the concentration of bicarbonate in the blood is reduced below the normal level." It will be noticed that no reference is made to acetone bodies or the excretion of ammonia, although an acidosis associated with ketonuria and an increased ammonia output in the urine is covered by both definitions. Various subdivisions of acidosis, such as compensated and uncompensated, relative and absolute, and alkalipenia or diminution of the alkali reserve, have been introduced to describe particular forms arising in special circumstances. For our present purpose, however, it will be sufficient if we agree on the fundamental feature of acidosis as it is now understood—namely, a diminution of the alkaline reserve of the blood and tissues—and only use the term in that sense, modifying it by the adjective "mild" or "severe" as may be necessary. In order to provide for the rare condition where there is an actual change in the reaction of the blood toward the acid side we may speak of an acidaemia. Alkalosis is the antithesis

of acidosis—that is to say, it is a condition in which the alkaline reserve of the body is abnormally increased—while in alkalaemia the excess of bases over acids in the circulation is so considerable that the physico-chemical reaction of the blood is shifted toward the alkaline side. In the following chart I have endeavoured to represent schematically the relation existing between the alkaline reserve, the non-volatile acids, and the carbon dioxide content of the blood in the various conditions we are considering.



A.R., alkaline reserve. CO_2, carbon dioxide. N.V.A. non-volatile acids. pH, acid-base balance, or hydrogen ion concentration.

This diagram also indicates the principles on which the determination and estimation of acidosis or alkalosis are based. The reserve of alkali in the blood is now generally estimated by determining its combining power for carbonic acid under standard conditions, or, indirectly, by ascertaining the tension of carbon dioxide in the alveolar air; for, as will be seen from the diagram, the combining power of the blood for carbonic acid, and therefore the tension, or percentage, of the latter in the air of the lungs, are directly dependent upon the relation existing in the circulation between the non-volatile acids and the alkaline reserve. The carbon dioxide capacity of the blood is usually estimated in the laboratory by Van Slyke and Cullen's method. It is hardly suitable for general clinical work, however, and reliance is more commonly placed upon some method of determining the carbon dioxide tension of the alveolar air. The simplest and most generally useful, in my opinion, is that devised by Marriott.[2] The subject breathes in and out of a rubber bag of about 1,500 c.cm. capacity, into which has been previously introduced about 600 c.cm. of air, about four times in twenty seconds, emptying the bag at each inspiration. The inlet tube is clamped at the end of an expiration and the air in the bag examined, within three minutes, by bubbling a fine stream through a solution of sodium bicarbonate containing a suitable indicator, and comparing the resulting colour with a set of standards marked to indicate the carbon dioxide tension. In the case of infants a smaller bag is used, of about 500 c.cm. capacity, and this is connected with a mask which fits tightly over the face. Crying during the collection of the sample is an advantage rather than a disadvantage, but must be avoided prior to the application of the mask, as it leads to a lowering of the carbon dioxide tension. The carbon dioxide tension in a normal adult at rest, as determined by this method, varies from 40 to 45 mm. Tensions between 30 and 35 mm. are indicative of mild acidosis. When the tension falls to 20 mm. there is serious danger, and in coma values as low as 10 or 8 mm. may be obtained. In infants the normal carbon dioxide tension is from 3 to 5 mm. lower than in adults. Purists may criticize the results obtained with Marriott's method, but if the findings are occasionally standardized, in order to detect deterioration of the solutions, they are of great practical use.

Limitations of time will only permit of my referring to one other test for acidosis—the tolerance for sodium bicarbonate. This depends upon the fact that not more than 0.5 gram of bicarbonate per kilogram of body weight, by the mouth, is required to render the urine of a normal person distinctly alkaline in reaction, whereas 0.8 gram may be needed in mild acidosis, and over 1 gram in more severe cases. This test has the merit of simplicity and is reliable for demonstrating the absence of acidosis, but it is not particularly dependable for showing either the presence or the degree of an acidosis when it exists.

Let us now consider the theoretical conditions under which acidosis and alkalosis may arise. Depletion of the alkaline reserve will result when there is an excessive introduction from without the body of acids, as occurs in mineral acid or carbonic acid poisoning, or when an abnormal formation of acids takes place within the organism, the classical example of which is diabetic acidosis; it may also result from an excessive accumulation of the normal acid products of metabolism in the system owing to deficiency in the excretory functions of the kidneys, as is seen in interstitial nephritis; or it may follow an exceptional drain of bases, from the body, such as may be induced by profuse diarrhoea. Alkalosis, on the other hand, will occur if the intake of alkaline bases is in excess of the excretory capacity of the organism and exceeds the neutralizing power of the non-volatile acids of the blood and tissues, a condition which can be produced by overdosing with sodium bicarbonate; a similar condition would arise should there be an unusually small amount of acid formed in the metabolic cycle, but of this there is no convincing example; an increase in the alkaline reserve may also be caused by the passage into the circulation of the alkaline radicals produced when neutral salts are decomposed and the acid radicals are excreted, as takes place temporarily during the normal formation of hydrochloric acid in the stomach and gives rise to more permanent changes in pyloric stenosis; finally, a diminution in the oxygen of the blood may excite the respiratory centre and lead to an excessive loss of carbon dioxide through the lungs, and, as there is no parallel fall in the bicarbonate content of the serum, alkalosis will ensue—a condition which may be produced by voluntary hyperpnoea or may be induced by breathing air with a diminished oxygen content, as at high altitudes. It is obvious, therefore, that acidosis, and to a less extent alkalosis, may be met with in a large variety of diseases, and that acidosis is not, as was at one time assumed, invariably dependent upon disturbances of carbohydrate metabolism.

Very little experimental work has been done upon the acid-base equilibrium of the blood during the early years of life, and a good deal of what has been published is contradictory. Ylppö[3] has stated that a condition of "physiologic acidosis" exists at birth and that the carbon dioxide dissociation curve is 20 per cent. less than in adults. Marriott[4] found that in children under 1 year of age the reaction of the blood tends more toward the acid side, and that the alveolar carbon dioxide tension is lower than later in life, a reading of 35 mm. not being abnormal. On the other hand, Seham[5] came to the conclusion that there is no constant difference in the carbon dioxide tension, and found that, as a rule, a much smaller dose of sodium bicarbonate in proportion to the weight is required to render the urine alkaline in young children than in adults. The observations of Blatherwick[6] upon calves are of interest in this connexion. It has long been known that cows normally excrete a strongly alkaline urine, owing no doubt to the nature of their diet, which commonly contains a large excess of basic elements; calves, on the other hand, which consume an approximately neutral diet of milk, usually excrete urine which is neutral or amphoteric to litmus. Judging from these facts we should expect calves to have a smaller alkaline reserve than cows, but Blatherwick proved that this was not the case, and that calves actually possess a larger alkaline reserve than grown cattle. He came to the conclusion, therefore, that a fundamentally different regulatory mechanism is functioning in the two cases. Whether there is an analogous difference between children and adults it is impossible to be sure at present, although the well known clinical fact that children are especially susceptible to acidotic conditions is suggestive, and when we consider the more rapid metabolism of the infant, with the constant changes in its tissues and body fluids caused by the need for growth as well as repair, it seems even more probable.

I do not propose to discuss the large variety of diseases in which acidosis may arise in children and materially add to the gravity of the condition individually, as they will no doubt be much better dealt with by those who have had greater experience of children's diseases. I shall confine my remaining remarks to two groups of cases, which have particularly come under my notice—namely:

(1) Those in which there is definite evidence of defects of carbohydrate metabolism—in other words, frank diabetics.

(2) Children suffering from recurrent "bilious attacks," with vomiting and transient ketonuria.

It is important that it should be generally realized that diabetes, or glycosuria, in children as in adults, is not a disease in the sense that it is always dependent upon the same cause. The investigations upon which I have been engaged for over twenty years have definitely proved that it is a condition which may arise in a variety of ways, and twelve types can now be differentiated. In some of these ketonuria and acidosis develop at an early stage, in others they are only met with as a terminal complication, the chief determining factor being apparently the functional efficiency of the liver. As long as the liver is able to perform its part in metabolism satisfactorily there is no fear of acidosis, even though there is pronounced hyperglycaemia and glycosuria; but when, owing to congenital defects, acquired deficiencies, or secondary disturbances in its functions, the liver is unable to carry out completely the chemical changes it normally performs, so that unusual acid products enter the circulation, the alkaline reserve of the body soon suffers and acidosis develops. These points were well illustrated by a partially depancreatized dog I had the opportunity of observing. In spite of a fairly high blood sugar and the constant presence of sugar in his urine, he appeared in good health and showed no evidence of acidosis until he was given a series of injections of hydrazine phosphate, a drug which is known to have a specific toxic effect upon the liver; he then rapidly developed the signs of acidosis and ultimately died of diabetic coma, the carbon dioxide of his blood falling from 81.5 to 45 per cent. and finally to below 30 per cent.

It is generally assumed that the depletion of the alkaline reserve which occurs in diabetic acidosis is entirely dependent upon the formation of acid products of imperfect fat metabolism, but the whole-blood analyses I have made in a large number of cases suggest that this is not the only explanation and that incompletely utilized protein derivatives are a contributory factor; also that in some instances defects in the excretory functions of the kidneys, similar to those met with in interstitial nephritis, accentuate the acidosis. In many cases, too, analysis of the faeces reveals an inorganic ash content considerably in excess of the normal, pointing to there being an abnormal excretion of bases through the bowel wall, a condition which would serve to diminish the alkaline reserve still further. It is not surprising, therefore, that acidosis of an advanced type, in which several of these factors are probably at work, is difficult to control, and especially in children, whose metabolism is less stable than in adults, as is shown by the fact that comparatively small changes in the diet of a diabetic child will often produce very striking results. Thus I have seen the addition of a single egg, or a dose of cod-liver oil, induce a ketonuria, which rapidly disappeared when the addition was discontinued. But such a result is not inevitable; it depends entirely on the type of case and the stage of the disease.

In the earlier stages of diabetic acidosis suitable regulation of the diet brings about a rapid improvement, and even in the more severe types the alkaline reserve can usually be brought back to the normal by appropriate treatment, if serious organic changes have not taken place in the liver and sufficient glycogen can be laid down. It has frequently been stated that diabetes in children is a hopeless condition, especially when there is acidosis and ketonuria, but, although this might have been true at one time, it is not the case now. I have records of over a dozen children under the age of 12 who are alive and well at least three years—in one instance ten years and in another twelve years—after I first saw them, in spite of the fact that they then exhibited evidence of acidosis and were suffering from pronounced glycosuria. In all of the more recent cases, where it has been possible to employ modern methods of investigation, the metabolic changes have proved, however, to be largely the result of functional disturbances, and there has been no evidence of serious organic mischief in the liver or pancreas. When there are permanent defects in these organs the problem is more difficult, and only temporary improvement can be effected, even with the most recent methods of treatment. The introduction of insulin has placed at our disposal a powerful weapon for dealing with acidosis dependent upon defective glycogen storage, but, unfortunately, its effects are only temporary in the majority of cases.

Take, for example, the case of a boy, 11 years of age, who was brought to me in January with a history of diabetes of two years' duration. His blood was then found to contain 0.36 per cent. of sugar, while the carbon dioxide tension of his alveolar air stood at the very low figure of 16 mm. After the injection of 25 units (old style) of insulin the carbon dioxide tension rose to 25 mm. and the blood sugar dropped to 0.30 per cent. in three hours. As the result of continued treatment with insulin, combined with dieting, during the following three weeks his blood sugar fell to 0.11 per cent., and the carbon dioxide tension of the alveolar air increased to 34 mm. Yet within a month of the injections of insulin being discontinued the blood sugar had returned to almost its original level, the carbon dioxide tension had diminished to 25 mm., and examination of a twenty-four hours' collection of the urine showed 1.96 grams of ammonia nitrogen and 2.3 grams of oxybutyric acid, in spite of every care being taken with the diet. A fortnight later the ammonia excretion in the urine had increased to 2.3 grams and 22 grams of oxybutyric acid were being passed.

The second group never exhibit the pronounced acidosis met with in some diabetics, but there is always evidence of a reduction of the alkaline reserve, particularly during an attack. The patients coming under my observation have varied in age from 2 to 12 years. As a rule they would seem to have been healthy infants; then, for no apparent reason, they commenced with febrile attacks, associated with loss of appetite, general malaise, sickness, and headache, which persisted for several days and recurred at intervals, generally of progressively shorter duration. During an attack examination of the urine shows the presence of acetone bodies, and, although Fehling's test is usually negative, or gives a doubtful reaction, Benedict's test often reveals traces of a reducing substance. It is a type of case with which everyone is no doubt familiar, and my only reason for referring to it is that I have been able to carry out more elaborate analyses than are usually performed. Let us consider an illustrative example.

In March, 1922, I was asked to advise regarding a boy, aged 11, who had been treated by several physicians for attacks of the type to which I have referred, which had commenced about three years previously and had recently become more frequent and severe. A twenty-four hours' collection of his urine, made towards the end of the attack from which he was then recovering, showed 0.8 gram of acetone, a total acidity of 600, an ammonia nitrogen of 0.79 gram, 0.35 gram of amino-acid nitrogen, 2.1 grams of sugar, a considerable excess of urobilin, and gave a pronounced reaction for indican. Two days later another collection of the urine, made on a test diet containing 70 grams of carbohydrate, 45 grams of protein, and 35 grams of fat, was found to be free from acetone and to show a lower total acidity (400) and ammonia nitrogen (0.59 gram), but still to contain a trace of sugar (1.9 gram). Examination of the faeces revealed no striking abnormality macroscopically or microscopically, although chemical analysis showed that there was 22 per cent. of inorganic ash, an excess of combined fatty acids relative to unsaponified fat, and a marked reaction for biliverdin. From these results it seemed probable we had to deal with a case in which there was a chronic catarrh of the small and large intestines, with abnormal decomposition in the contents of the upper bowel and interference with the functions of the liver, giving rise to ketonuria and slight alimentary glycosuria. A full analysis of a sample of blood taken from a vein before breakfast tended to confirm these conclusions, for it showed an excess of uric acid (4.5 mg. per cent.), amino-acid nitrogen (9 mg. per cent.), ammonia (0.9 mg. per cent.), and phenols (14 mg. per cent.), while a low calcium content (2.5 mg. per cent.) suggested a possible explanation of the bleeding from the nose to which the patient was liable, and the presence of only 48 volumes per cent. of carbon dioxide showed that there was mild acidosis.

A serial analysis of the patient's blood and alveolar air before and after a test breakfast containing 40 grams of starch but no sugar worked out as follows:

Time Taken.	Sugar, per cent.	Total Carb., per cent.	Difference Value, per cent.	Alveolar CO_2.
Fasting	0.050	0.054	0.004	30 mm.
Meal	—	—	—	—
½ hour after meal	0.070	0.070	0.000	28 mm.
1 hour ,, ,,	0.090	0.090	0.000	25 mm.
2 hours ,, ,,	0.070	0.072	0.002	28 mm.
3 hours ,, ,,	0.050	0.054	0.004	30 mm.
4 hours ,, ,,	0.050	0.054	0.004	30 mm.

Next day he was given 40 grams of pure dextrose, fasting, and another serial analysis of the blood was carried out:

Time Taken.	Sugar, per cent.	Total Carb., per cent.	Difference Value, per cent.	Alveolar CO_2.
Fasting	0.050	0.054	0.004	30 mm.
Dextrose	—	—	—	—
½ hour after dextrose	0.190	0.190	0.000	25 mm.
1 hour ,, ,,	0.140	0.140	0.000	28 mm.
1½ hours ,, ,,	0.090	0.090	0.000	29 mm.
2 hours ,, ,,	0.060	0.062	0.002	30 mm.

These analyses showed that the sugar content of the blood was low after the night fast, and that a meal of starch, protein, and fat induced comparatively little change, but that after sugar had been taken there was a sudden rise to an abnormal level followed by an equally rapid fall. Examination of the urine showed no sugar after the mixed meal, but 1.5 grams were passed in the two hours following the sugar test. Such findings are very characteristic of insufficient storage capacity on the part of the liver and other tissues, and are commonly associated with defects in the functions of the ductless glands, in my experience. The normal difference value of the blood found in both tests tended to exclude deficiency of the internal secretion of the pancreas. Turning now to the carbon dioxide tension of the alveolar air, it will be seen that it was subnormal in the fasting state and fell further as the sugar content of the blood increased, showing that the alkaline reserve of the body was deficient and that it diminished as the alkaline secretions of the pancreas and intestine were poured out.

Working on the hypothesis indicated by these analyses, that the condition of the patient was due to a chronic intestinal catarrh, associated with hepatic insufficiency, he was put on an appropriate diet, and given intestinal antiseptics with a small regular dose of grey powder, with the result that the attacks diminished in frequency and then ceased, while his general health has improved.

Similar treatment in other cases has had an equally beneficial effect, although in some, where evidence of insufficiency of the digestive functions of the pancreas was also found, have proved more difficult to deal with.

I have had no personal experience of alkalosis in children, and, as far as I can find, there is little literature on the subject. It is probable that an increase in the alkaline reserve is partially responsible for the symptoms met with in pyloric stenosis and infantile tetany, but accurate observations are apparently lacking. It is known, however, that tetany can be induced in animals by injecting alkalis, and I am acquainted with one case where tetanic convulsions followed an attempt to treat a diabetic acidosis in an infant by intravenous injections of sodium bicarbonate. An interesting case of alkalosis, with periodic attacks of vomiting, in an adult has been described by MacAdam and Gordon,[7] who found that the condition could be controlled by large doses of dilute hydrochloric acid. Whether similar treatment might be useful in the cyclic vomiting of children is not certain until more is known about the acid-base equilibrium in that condition; but, as it has been found that alkalis have a beneficial effect in some cases, it is probable there is often an acidosis and not an alkalosis.

Judging from the experimental work of Wilson[8] and others, it would seem probable that the equilibrium of fixed acids and bases in the body is intimately related to the functional activity of the ductless glands, and particularly the parathyroids, removal of which leads to a relative increase in the bases, with resulting tetany, which can be relieved by the injection of acids or soluble calcium salts. Analyses of the blood in the few cases of alkalosis I have met with in adults have invariably indicated the existence of some ductless gland deficiency, and treatment with appropriate gland preparations and calcium by the mouth has brought about improvement; but I have no evidence to offer that a similar condition occurs in children, or that treatment of an alkalosis in them on the same lines would be beneficial.

In conclusion, I should like once more to emphasize the warning with which I commenced—that ketonuria does not necessarily imply acidosis; I would now go further and point out that the presence of acetone bodies may be associated with alkalosis, as was conclusively proved in MacAdam and Gordon's case. As far as I am aware it is a unique example, but Davies, Haldane, and Kennaway[9] have shown that acetone bodies may appear in the urine as a result of the administration of large doses of alkalis.

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DISCUSSION.

The PRESIDENT said that there was still considerable confusion in his mind as to the differentiation and effects of acidosis and alkalosis. Ketosis was an acidosis due to imperfectly desaturated fatty acids circulating in the blood. At what stage did this become an acidaemia? Could ketonuria occur without acidaemia? If so, as had been pointed out in the observations that ketonuria had been found in alkalosis and also as the result of large doses of alkali, it was somewhat confusing, for this implied that there was an acidaemia or acidosis, and that imperfectly desaturated fatty acids were circulating in a *plus* alkaline blood—in other words, a blood in which there was an excess of alkaline bases. He also inquired about the effect of the oxidase, glutathione, discovered by Hopkins, in the oxidation of fatty acids.

Dr. E. P. POULTON (London) said that, while listening with great interest to Dr. Cammidge's paper, and feeling complimented that he had used a classification which he (Dr. Poulton) happened to have put forward in a letter to the BRITISH MEDICAL JOURNAL two or three years ago, he felt now that such a classification was not satisfactory. This was chiefly because the condition of want of oxygen which, as Dr. Haldane had pointed out, caused alkalosis, led secondarily to diminished alkali reserve, so that on Dr. Cammidge's nomenclature there would be an alkalaemia causing a secondary acidosis. The Haemoglobin Committee had issued a report which advised that the terms "acidosis" and "alkalosis" should be abolished, and that a diminished or increased hydrogen-ion concentration should be called "alkalaemia" and "acidaemia." Possibly "alkalosis" or "acidosis," if used at all, might be applied to the process leading to alkalaemia or acidaemia, in the same way as, in Sir Clifford Allbutt's nomenclature, the process of hyperpiesis led to the condition of hyperpiesia. He protested against Dr. Cammidge's revival of Pavy's CO_2 tension theory of diabetic coma, since Professor Pembrey and his colleagues showed many years ago that this was untenable—namely, that the CO_2 in the tissues was not increased and that the blood could transport large quantities of CO_2 in addition to what they contained. He was very doubtful whether the liver was chiefly responsible for the production of ketosis. The latter was not very characteristic of acute yellow atrophy, and during fasting the liver was certainly not diseased. He referred to the association of alkalaemia with tetany, particularly as produced by forced breathing. It might not be the alkalaemia itself, but some alteration in the balance of metallic ions, and among

them calcium, that might be the real cause of this type of tetany. He mentioned a case of tetany under his care which had a gastro-colic fistula, through which the patient lost valuable HCl in the stools. MacAdam and Gordon's case of periodic vomiting, in which there was fairly good evidence of alkalaemia, was of interest in view of Haldane's experiments with ammonium chloride and calcium carbonate. Ammonium chloride was commonly given in these conditions, and Haldane found an increase of fixed acid in the blood when this substance was taken by the mouth. With ammonium chloride the ammonia was converted into urea, so that the HCl was free in the blood. Similarly with calcium chloride the blood was flooded with HCl, calcium being excreted by the bowel as calcium carbonate. In two cases of acute rickets Mr. Osman, working with Mr. Burgess at Guy's Hospital, had found a marked fall in plasma bicarbonate, which could not be accounted for by the slight ketosis present in one of them. He doubted whether this diminished plasma bicarbonate was really the cause of the disease; it was more likely a collateral phenomenon due to alteration in the proportion of the mineral constituents of the blood. Finally, Dr. Poulton doubted whether either acidaemia or alkalaemia by itself was of so much significance in disease as had often been considered. Alkalaemia of measurable degree could be readily produced by taking large doses of sodium bicarbonate. With Campbell Hunt he had found roughly the same degree of acidaemia in bronchitis and emphysema, in diabetics recovering from coma, and in uraemic coma, though the symptoms were very different in these cases; but a warning should be given that there were great difficulties in determining accurately the reaction of the arterial blood at the present time.

Dr. ERIC PRITCHARD (London) asked what practical value could be got out of this academic discussion. He agreed that the commonly held view that acidosis and ketosis were the same obscured the real significance of acidosis. Health in children depended almost more on the extent of the alkaline reserve than on any other factor. It was important to find out under what conditions this reserve was reduced. If acids were produced during metabolism they must be neutralized. Unless they were excreted the result would be an increase of fixed acids in the blood. The kidneys were not the only means of getting rid of metabolic products; surely more importance should be attached to the faeces. In rickets, for instance, a striking feature was the fatty stool. Bases were excreted in combination with the fatty acids in the faeces, and the alkaline reserve was thus rapidly depleted. The presence of fatty acids in the faeces might be due to unabsorbed fat; or fatty acids might be produced by internal metabolic processes, neutralized, and then excreted by the intestine. That the latter was possible was shown by Heidenhain, who isolated a loop of intestine and found after seven or eight days that it contained faecal matter similar to that in the rest of the gut. Non-volatile acids appeared to be present when there was incomplete combustion of food. If a child was allowed out of doors after being kept in a warm room its metabolism was doubled. Substances which were not metabolized appeared in the faeces. Reduction in the alkaline reserve was the result of defective oxidation and excretion of fats by the intestine. Defective oxidation followed overfeeding and absence of fresh air and sunlight. Dr. Pritchard then discussed calcium metabolism. The amount of calcium required in the general metabolism in infants was 0.2 gram in twenty-four hours. If the blood was not able to supply this it was taken from the tissues, especially from the bones. Infants were born with a calcium reserve in the bones, but in premature infants there was no such reserve. In them there was danger of calcium starvation.

Dr. CATHERINE CHISHOLM (Manchester) said that the readers of the papers threw light on various phenomena observed by clinicians. Tetany in marasmic infants she had been accustomed to regard as a result of parathyroid defect. Now it appeared also to be due to alkalosis. Was the parathyroid action that of producing an alkalosis? Would, therefore, this condition be relieved by administering acids? The relief produced in some forms of pneumonia, particularly after infections such as measles, was, in her experience, often relieved by large doses of sodium bicarbonate. Presumably this was because it relieved the acidosis.

Dr. CAMMIDGE, in reply, said that to do justice to a subject of this description it would be necessary to use terms which it would be very difficult for anyone not trained in the latest developments of chemistry to understand. He had therefore tried to simplify the subject and had excluded any unfamiliar expression. For this reason he adopted a classification obvious to everyone. He had been obliged to use the words "acidosis" and "alkalosis." They occurred, in fact, in the title of the discussion. Inorganic salts in the body bore a fixed relation to each other. If this were altered the tissues did not function normally. He had proved this experimentally by perfusing livers with solutions containing various proportions of salts. He could alter the rate of glycogen metabolism according to the solution used. With regard to calcium, it was normally contained in the blood in saturated solution. It was excreted by the intestine. In chronic colitis, as also in some other conditions, and often in diabetes, the faeces contained a high proportion of inorganic ash. This was excreted chiefly in combination with fatty acids. Calcium in the blood was diminished after removal of parathyroids and increased by subsequent parathyroid feeding. The magnesium in the blood was also affected. Injection of magnesium salts produced anaesthesia. Tetany could also be stopped in that way.

COW'S MILK IN INFANT FEEDING.

BY

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CONSIDERABLE publicity has been given in the lay press to the statement of Dr. Eric Pritchard at the National Conference on Child Welfare, held in London at the beginning of July, to the effect that the giving of cow's milk to infants was equivalent to infanticide, as the infant could no more digest cow's milk than it could digest lobster. Such a statement, taken apart from the rest of the distinguished pediatrician's address, naturally appealed strongly to the lay reporter, but conveys an impression to the public mind which was quite different from that actually conveyed to Dr. Pritchard's audience, of which I happened to be one. The general impression conveyed to my mind by the first day of the conference was the need for emphasizing the value and necessity for breast-feeding.

The feeling of that conference was that not only mothers, but nurses—and even doctors—required education on this important point, and if this be the case I think no apology is needed for introducing at this meeting a short paper on the subject of cow's milk.

Professor Richet of Paris has put the view I should like you to endorse in words which may be freely translated as follows:

> "For the newborn infant any method of bringing up except the natural one is detestable. The cleverest chemist will not succeed in inventing for the newborn infant a food superior to woman's milk. To replace the mother's breast, when well supplied with milk, by a feeding bottle or a spoon is a crime. I am so thoroughly convinced of this," he continues, "that I should think a doctor dishonoured if he were to say to a mother: 'What is the use of suckling your child? It is undergoing an unnecessary fatigue. Make haste and dry up your milk and give your child cow's milk, sterilized, condensed, or in powder, and you will see the little one thriving quite as well.'"

Apparently such practitioners do exist, and to those I would say that physiology and medical practice, supported by statistics from practitioners of preventive medicine and fortified by common sense, demonstrate that in order to keep down infantile mortality maternal milk is the first essential, and to give the miniature man or woman the best possible start in life whenever breast-feeding is possible it should be enjoined rigorously, and, if the infant is thriving, exclusively. Nevertheless there are cases, unfortunately only too numerous, in which breast-feeding is impossible. Many modern women are bad nurses: they have some milk,

but the quantity is insufficient, the quality is mediocre, and the infant does not thrive.

At the recent conference to which I have referred above a strong plea was made for wet nurses, but as a rule an artificial substitute for the missing natural aliment has to be sought. Experience and the best medical judgement have confirmed the use of cow's milk in some form or other as generally the best and most practical substitute for mother's milk. It is when we come to the form in which cow's milk is to be used we find ourselves on debatable ground.

Primarily there were two schools of thought, one of which advocated living instead of "dead" milk. The advocates of so-called "living" milk claimed that raw milk possessed diastatic activities or ferments which played an important physiological part in regard to the child. Certain of these ferments of a digestive order, they considered, assisted and completed the child's own digestive capabilities, whilst others were absorbed by the mucous membrane of the intestines and played an exciting part *vis-à-vis* the nutrition and cellular activity of the infant. This theory, seductive as it is, is unsupported by proof, and the employment of raw milk in the hand-feeding of infants has not furnished us with the results anticipated by theorists. On the other hand, this method of feeding can produce very serious results by reason of the bacterial infection it can engender. Indeed, in the light of recent work dealing with the subject it has been established that, except in the case of human milk, the fact that milk is "living" constitutes a disadvantage rather than an advantage for the nourishment of the infant.

Professor Marfan, the distinguished French pediatrician, is very fond of saying, "Cow's milk is better raw than cooked for calves and better cooked than raw for infants." When we consider the effects of heat on the constituents of milk we find that the chemists tell us that there is no demonstrable difference in the composition of various animal caseins. To chemical science they are identical, but biology shows us that this conception is erroneous and that each species of animal possesses its own particular kind of casein, differing distinctly from the others in some special characteristic. It is the nature of this special characteristic that renders the casein of one animal to an appreciable extent toxic on ingestion by an animal of another species, and I suggest that it is this point which has hardly been fully appreciated in the past. Cow's milk is to a certain extent toxic to infants, and indeed to all animals except calves. We must start out with this fact in our minds in considering the use of cow's milk in infant feeding, and its appreciation once and for all disposes of any leanings towards raw milk, as heat has been found to be most efficacious in diminishing the special characteristics of an albumin. Heat causes an albumin to lose its individual characteristics and thereby diminishes its toxic action. In the manufacture of therapeutic serums the products are submitted to a series of successive heatings, which diminish this toxic action. The French are so alive to this need for heating cow's milk in order to adapt it to infant feeding that M. Rousseau, the chemist at the Ecole de Puériculture at Paris, has invented an apparatus by which a thin film of milk is submitted to a high temperature for a short period in a steam jacket.

Despite the progress which has been made in improving the quantity and quality of cow's milk at reasonable cost, the public health official and the pediatrician in Europe, Asia, and America are confronted in many localities (*a*) with the high cost, (*b*) with the scarcity, (*c*) with the impossibility of securing a safe supply, and (*d*) with the inability of a large number of householders properly to handle and prepare milk in the home.

In a report issued by the Treasury Department of the United States Government last October, Drs. Clark and Collins of the United States Public Health Services stated:

"Over large areas of our country (America) milk is not produced in sufficient quantity to supply the local needs. One of the writers visited a State where in some localities milk retails at a dollar a gallon, obviously beyond the means of a large part of the population. In other sections of this country it is produced in such quantity that much of it goes to waste because of lack of transportation facilities or the limit of the distance which milk may be transported, the factors of time and the temperature operating to cause deterioration. It is for these reasons that inquiring minds have turned to the solution of these problems and sought to make generally available this valuable food at reasonable cost by converting it into a form in which its bulk and perishable nature would be diminished. Two products have been the results of their labours—namely, (1) condensed and (2) dried milk."

The former of these products has been the subject of much controversy, and there have been battles royal between authorities on infant feeding in both Europe and America on the value of condensed milk; some writers have praised it to the skies, whereas others have damned it to the deepest depths of perdition. Except for occasional use most physicians in both hemispheres were against the use of condensed milk until comparatively recently, when in January, 1919, Professor Calmette made a notable communication to the Academy of Medicine in Paris. After recalling the terrible mortality which raged at Lille during the German occupation and describing the physiological misery of the inhabitants, the development of tuberculosis due to privations and insufficient nourishment, Calmette made an unexpected and surprising statement. He claimed that the decrease in the mortality of infants under one year of age was due to the fact that their exclusive diet was condensed milk supplied by the neutral Committee of Assistance.

"Experience," he said, "has demonstrated the quite remarkable excellence of this regimen; with the exclusive use of sweetened condensed milk our infant welfare centres, which have not ceased exercising their activities, have seen the disappearance of enteritis and the gastro-intestinal troubles to which, before the war, 18 to 21 per cent. of the Lille babies succumbed in the course of their first year."

The claim of such an authority as Calmette naturally received a great deal of attention, and his experiences in Lille have been followed up by other French workers.

Condensed milk has found an enthusiastic advocate in Dr. P. Lassablière, director of the laboratory of the Faculty of Medicine, Paris, who has written a small treatise entitled *Le Lait Condensé*, which was awarded the Prix Jeunesse by the Faculty of Medicine in Paris in 1919. This has been translated into English under the auspices of the monthly review *La Médecine*. The author's view may be gathered from the following brief extract:

"When a mother cannot nourish her child herself the doctor will do well to recommend condensed milk. Feeding with condensed milk requires careful management, like all artificial feeding, but I assert when so managed it is suitable for children of any age, even from the first weeks after birth. Hundreds of observations have led me to this conviction, which I hold in spite of the opinion of those medical men who see in the good results obtained a mere chance success or an apparent one only."

I am inclined to think that most British observers will be amongst the medical men so referred to, as personally I have found that infants reared on sweetened condensed milk are fat, pale, and often listless. The obvious fault in such dietary is the large amount of cane sugar, but this defect is glossed over by Dr. Lassablière in the following words:

"The small percentage of cane sugar in dilutions of condensed milk has been observed to do no harm, and even at its worst has nothing but a slight laxative effect if not digested. This is often desirable in infants with a tendency to constipation. The sour gaseous stools of carbohydrate indigestion are not due primarily to sugar but rather to the abnormal flora of the intestine causing putrefaction."

This statement I find most unconvincing, and I shall be surprised if this audience agrees with the French savant.

It must not be supposed that Calmette's remarkable claims for condensed milk have been generally accepted by the medical profession on the other side of the Channel; on the contrary there is a large group of specialists who strongly support the use of the second form of preserved cow's milk to which I have referred. Drs. Aviragnet and Dorlencourt are just as enthusiastic with reference to dried milk, and I think I am right in saying that, on the whole, while the older pediatricians in Paris stick for fresh milk the younger men advocate the dried variety. Milk powder is, indeed, only beginning to make headway, which is surprising, as the product was first suggested as a food for infants in France nearly twenty years ago. Personally I have been acquainted with milk powder for nearly fifteen years and have used it extensively in India. A great deal

has been written about this product, and one of the most striking things at the National Milk Conference held at the Guildhall last October was the remarkable unanimity of the medical speakers with regard to its usefulness; but I do not think it is sufficiently realized that the product varies considerably in characteristics according to the method by which it is prepared. Two processes of manufacture are now in use. The first of these consists in the rapid drying of fresh milk on rollers heated by water or steam, and the subsequent powdering of the solids thus obtained with or without admixture of lactose; the second in the projection of milk in the form of a fine spray into a chamber with a current of hot dry air, so that the milk solids fall on the floor in the form of fine powder.

The powders produced by these two processes differ not only in physical characters but also in their reaction to rennet. Roller process powders, for instance, are not soluble in cold water, whereas spray powders are soluble; but the most important difference is the fact that whereas the addition of rennet to reconstituted milk prepared from the former variety produces a fine flocculent curd, its addition to a solution of spray process milk powder forms a dense mass identical with that formed in raw milk. This difference is important, for it was the character of the curd described by French writers as "just like human milk" which first led most of us to advocate the use of milk in this form for infant feeding. Another characteristic of dried milk which has always appealed strongly to me is the constancy of its composition. Nothing is more notorious than the variation in the composition of the milk of one cow, but Dr. James Crowther has drawn attention to the remarkable variation in the milk of small herds as well. In a paper read at the National Milk Conference he pointed out that the variation of fat from day to day is not great in either morning or evening milk when considered separately, but as between morning and evening milk the range of variation is relatively enormous.

In regard to vitamins, I might mention that Professor Dreyer of Oxford University has pointed out that it is only the "C" vitamin which is reduced in quantity by heat. It is destroyed altogether by double heating, reduced considerably by the longer periods of heating at low temperature commonly practised, but only slightly affected by rapid boiling or short heating at temperatures near the boiling point. It may be asserted, therefore, that milk loses little of its vitamin content by the process of drying, whereas with commercial pasteurization there is a tendency to reheat the milk in the home and thus destroy all the "C" vitamin. It is suggested that it is twice-heated milk which causes infantile scurvy.

I consider that milk in this form is especially adapted for mixed feeding, in which, perhaps, the best practice consists not in giving breast feeds and bottle feeds alternatively, but at each feed giving first the breasts and then a bottle in which the amount of milk corresponds as nearly as possible to that in which the former was deficient. Frequently the complementary feed, especially in young infants, is very small, and if ordinary milk be used we are faced with considerable difficulties in regard to obtaining it absolutely fresh, while if condensed milk is used wastage is almost unavoidable. Milk powder can be kept in a tin for weeks, and the French authorities strongly recommend it and largely employ it when a complementary ration is required to supplement the mother's milk.

It is obvious from the foregoing remarks that the subject I have ventured to bring before you is one on which strongly divergent views are held by various authorities on both sides of the Atlantic. We have what might be called three distinct schools of thought—namely, the fresh milk school, the condensed milk school, and the dried milk school. Famous names can be found in the members of each school, and it might not be unprofitable in this discussion to bring out the special qualities claimed for each variety, as the best practice may be found in a knowledge of and judicious employment of all three varieties.

Personally, my experience has been chiefly in hot countries, where milk is more putrescible, more sophisticated, and even more liable to contamination than in temperate climates. Under such conditions for infant feeding one has turned gratefully from the "white sewage" of the bazaars to the comparatively sterile milk powders.

DISCUSSION.

Dr. ERIC PRITCHARD (London) said that the statement made by him regarding cow's milk referred only to infants in the first few days of life and to undiluted milk. It came as rather a shock to him that milk had toxic properties. Normally he thought that such substances were broken up and detoxicated in the process of digestion. With regard to the use of condensed milk, when one had pathological cases they had to be fed pathologically. All kinds of milk were useful if properly used.

Dr. CATHERINE CHISHOLM (Manchester) felt it advisable to stress the necessity of teaching medical practitioners and students the principles underlying the maintenance of a good breast secretion. They taught the necessity of breast-feeding, but they were too ready to accept the statement that the milk was insufficient and poor. She felt that all forms of milk could be used by some healthy children, and agreed that all types of preparation had their uses if given according to indication. The difficulty of using dried milk for children with dyspeptic difficulty was that it was not so easy to vary the constituents of fat, protein, and sugar according to the varying necessity of the case.

PROGNOSIS AFTER REMOVAL OF SEMILUNAR CARTILAGES.

BY

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THE object of this paper is to review the results of a series of cases of meniscotomy and to endeavour to investigate any factors which influence the prognosis after operation. This paper is based upon a series of 50 cases, the majority of which were treated in the army, and owing to favourable local conditions one was enabled to keep the patients under observation for a sufficiently prolonged period while they performed ordinary duties and partook of vigorous exercises—for example, football, swimming, etc.

It was a curious fact that during the Mesopotamian campaign internal derangement of the knee was an epidemic condition, especially prevalent in the autumn. The probable explanation of this was that during the summer months all hostilities automatically ceased and strenuous exercises and games were in abeyance. The result of this inactivity combined with excessive heat was that muscles, ligaments, and other periarticular structures rapidly lost their tone. With the onset of the autumn an active life was abruptly resumed, and as a consequence internal derangement occurred before the structures supporting the joint regained their tone.

That loss of tone is a predisposing cause of internal derangement of the knee is also suggested by the fact that derangement sometimes follows a simple effusion when a sudden strain is thrown on the knee before the effusion has completely subsided. This occurred in one case of this series when internal derangement followed simple traumatic synovitis; the patient slipped into a river and displaced his internal cartilage while struggling out again.

The war in Mesopotamia virtually ended in the spring of 1917, after which the Expeditionary Force became an army of occupation. This obviated the need of continual movement of men, hence after operation men could be posted for duty at base units, and so "followed through" as long as necessary.

Treatment was carried out on the lines now almost universally adopted. After the first attack the limb was splinted, in the hope that adhesions might form and refix a separated cartilage to the capsule. It is imperative that reduction of the cartilage is first obtained, and if the cartilage is merely displaced or torn without separation of fragments fixation may then occur.[1] Patients who had suffered more than one attack were strongly advised to submit to operation.

OPERATION.

I do not propose to discuss details, but merely to refer to a few salient points. A rubber bandage was always used as a tourniquet, and the leg firmly held by an assistant at about 120 degrees, the heel resting upon the table across the opposite leg. The advantage of this is that further flexion and rotation can easily be obtained. The surgeon stands on the opposite side and is thus enabled to look directly into the joint. This series of cases only includes those in which a definite diagnosis of displaced cartilage had been made, therefore Annandale's transverse interarticular incision was used, modified by a slight curvature upwards by the side of the patellar ligament in front. Posteriorly it extended to half-way round the joint, the internal lateral ligament not being endangered, as this structure lies postero-internal. I am aware that the vertical curved incision of Sir Robert Jones gives a better exposure for a general survey of the joint, but when the diagnosis of displaced cartilage is practically certain the transverse incision gives a more direct approach.

The cartilage, having been exposed, is hooked out and as much as possible removed, the synovial membrane then being inspected for fringes, tags, etc. Sutures of plain catgut are used for synovial membrane and capsule, and silkworm gut for the skin, the sutures being interrupted so that any excess of post-operative effusion can escape between the stitches. A bandage is applied firmly before the tourniquet is removed, and the patient returned to bed without a splint. The following day it is usually found necessary to loosen the bandage as swelling of the joint renders it uncomfortable.

Probably no muscle in the body wastes more rapidly than the quadriceps extensor, and therefore massage of the muscle is commenced on the second day. At the end of four days the bandage is further loosened to allow limited movement, which is speedily encouraged, and the patient is allowed up with a stick at the end of twelve to fourteen days, the inner border of the boot being raised about a third of an inch to take the strain off the inner aspect of the capsule.

In this series of fifty cases on only one occasion was the external cartilage the seat of the trouble. Von Bergmann states that the internal cartilage is separated "more than twice as commonly as the external";[2] this probably underrates the relative frequency.

I append a list of the relative frequency of pathological changes found in this series; in many cases more than one change was present, but to avoid complications I have only indicated the most obvious lesion.

Circumferential split	27
Definite abnormal mobility	15
Frayed or flattened	6
Doubtful increased mobility	2

Although in the last group no definite mobility was discovered, removal of the cartilage relieved all symptoms—a condition which has been remarked upon by Rendle Short.[3]

With regard to the length of time which should elapse between separation of the cartilage and operation, it is wise to wait a few days until the acute traumatic inflammatory reaction has subsided. There seems no need to wait until all the fluid has been absorbed; this may be a matter of weeks. In seven cases an ounce or more fluid escaped on opening the joint and no untoward complications occurred.

PROGNOSIS.

In considering the prognosis special attention was paid to the following features:

(*a*) *Recurrence.*

(*b*) *Pain.*—This is, of course, a difficult symptom to assess at true value. Many patients complain of slight or diminishing pain for an interval varying from a few weeks to two years, but unless it caused actual disability such pain has been ignored in considering the prognosis.

(*c*) *Movement.*—With a relatively healthy joint, followed by absence of splinting and early movements, there seems to be no reason why movement should be restricted after operation.

(*d*) *Stability.*—A "feeling of weakness" is a common immediate after-result of meniscotomy. This is in a great measure psychical, as the patient is often accustomed to the deranged knee feeling weaker than its fellow. Encouragement soon leads to re-education and restoration of confidence; and in the majority of cases the patient soon learns to trust his knee again and appreciate its stability.

Results fall naturally into three groups:

1. *Good.*—Where there is negligible pain, no sensation of weakness, and movements are unimpaired. This group includes two professional footballers and one music-hall dancer, all of whom subsequently followed their normal occupations.

2. *Fair.*—This includes cases in which there is slight limitation of movement or pain occurring periodically or when the limb is placed in certain positions.

3. *Poor.*—This includes cases in which recurrence takes place or range of movement is less than a right angle. Also are included cases in which pain is frequent or a sensation of weakness remains in the joint.

In considering these cases it is interesting to note that prognosis appears to depend chiefly upon two factors—firstly, the number of attacks, and secondly, the age of the patient. Hence I have analysed the series from these standpoints.

A. ***Prognosis in Relation to Number of Attacks.***

(Group I consists of cases with not more than three attacks; Group II of cases with more than three attacks.)

	Group I (29 cases).	Group II (21 cases).
Pain:		
None or insignificant	23	13
Periodic	3	5
With certain movements	3	3
Movement:		
Unimpaired	24	15
Slightly impaired	4	3
Less than 90 degrees	1	3
Stability:		
Normal	27	15
Sensation of weakness	2	6
Results:		
Good	22	13
Fair	6	5
Poor	1	3

There were no recurrences in Group I; two in Group II.

It will be noticed that, as would naturally be expected, the results of operation before repeated attacks have caused stretching of the supporting structures or early osteo-arthritis are much superior to those obtained in later cases.

Symptoms recurred in two of the later cases. In one this was shown to be due to foreign bodies in a joint which was the seat of osteo-arthritis. In the other subsequent operation was refused and no cause could be stated; possibly the failure was due to excessive traction on the cartilage during removal causing separation of the posterior remaining portion—a danger which has been emphasized by Sir Robert Jones.[4]

The occasional pain relatively more frequent in the later cases was usually associated with changes in the weather, suggesting its association with secondary osteo-arthritis.

B. ***Prognosis in Relation to Age.***

(Group III consists of cases under 30 years of age; Group IV of cases aged 30 and over.)

	Group III (31 cases).	Group IV (19 cases).
Pain:		
None or insignificant	26	10
Periodic	1	7
With certain movements	4	2
Movement:		
Unimpaired	25	13
Slightly impaired	4	3
Less than 90 degrees	1	3
Stability:		
Normal	28	14
Sensation of weakness	3	5
Results:		
Good	25	9
Fair	4	7
Poor	1	3

There was one recurrence in each group.

As was to be expected, prognosis in the elder patients was less good than in the younger, for the power of recuperation diminishes with age and osteo-arthritic changes are more prone to occur. Also as a rule the elder patients have been subjected to more numerous attacks.

By combining the two groups the results of operation were: Good, 35 cases (70 per cent.); fair, 11 cases (22 per cent.); poor, 4 cases (8 per cent.). Hence the prognosis is not by any means assured, but I believe these figures indicate a fair average of the results that may be expected if cases are "followed through" after operation. This is particularly necessary with internal derangements of the knee-joint, as cases apparently cured may relapse after a period of freedom. In one patient in this series who was apparently cured the condition suddenly recurred after an interval of nine months of strenuous life.

Prognosis should be especially guarded where attacks have been frequent and in the elderly. On the other hand, when once attacks have become established insecurity of the joint and osteo-arthritic changes are a natural sequence and may be diminished or controlled by removal of the offending cartilage.

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THE ANTISEPTIC ACTION OF THE STYRYL-PYRIDINES AND STYRYL-QUINOLINES.*

BY

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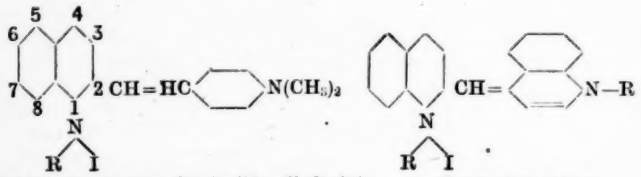
THE formation of styryl-quinoline derivatives by the condensation, in presence of piperidine, of p-dimethylamino-benzaldehyde and quaternary salts of quinaldine and lepidine was noticed by König,[4] and, later, Barbier[1] and König and Treichel[5] described a number of substances of this type. Recently Mills and Pope[6] described the preparation of a similar kind of compound from α-picoline methiodide, and also recorded the fact that this material, like the cyanines, possesses photosensitizing properties. The similarity in structure between these substances and those of the isocyanine type, together with observations made by us showing that the antiseptic potency of the isocyanines was increased by simplification of the quinoline portion of the molecule, suggested the possibility that the styryl compounds might also exhibit antiseptic activity. The relation between the two types will be apparent from the appended formulae:



Dimethylamino-styryl-quinoline alkyliodide. Isocyanine iodide.

Preparation of the Styryl Compounds.

One molecule of p-dimethylamino-benzaldehyde and 1 molecule of the quinaldine methiodide were dissolved in alcohol, and the solution boiled for three to four hours after the addition of a small quantity of piperidine. The dyestuff, which crystallized on cooling, was in some cases recrystallized from alcohol. This further purification, however, did not increase the antiseptic potency.

These bodies have the advantage over the cyanines of being much more easily and rapidly prepared, and are obtained in much better yields. The following compounds were tested:

2 p-dimethylamino-styryl-pyridine methiodide;
2 p-dimethylamino-styryl-quinoline methiodide and ethiodide;
2 p-dimethylamino-styryl-6 aminoquinoline methiodide (base and hydrochloride);
2 p-dimethylamino-styryl-6 methylquinoline methiodide and methochloride;
2 p-dimethylamino-styryl-6 methylquinoline allobromide;
2 p-dimethylamino-styryl-6 methoxyquinoline methiodide and the corresponding ethoxy compound;
2 p-dimethylamino-styryl-7 aminoquinoline methiodide hydrochloride.

Antiseptic properties were determined, as previously described.[2 3]

To 1 c.cm. of culture medium were added varying amounts of the substances to be tested along with 0.1 c.cm. of a 1 in 1,000 dilution in saline of a twenty-four-hour culture of the organisms (*Staphylococcus aureus* or *B. coli*) in peptone water. As test media (*a*) 0.7 per cent. peptone water with a P_H value of about 7.2, and (*b*) undiluted ox serum (previously heated at 56° C.) were employed. The mixtures were then placed at 37° C., and were examined after forty-eight hours for the presence or absence of growth, which was determined in each instance by the appearance of turbidity in the fluid, and also by subculturing a loopful on agar.

In the case of *Staphylococcus aureus*, the sterilizing concentration of the above-named substances lay between 1 in 200,000 and 1 in 1,000,000 both in peptone water and in serum, except with 2 p-dimethylamino-styryl-pyridine methiodide, which was distinctly weaker (1 in 40,000 was required to produce sterility in both media). Toward *B. coli* the antiseptic action was never greater and usually somewhat weaker than toward staphylococcus. For *B. coli* the most powerful compounds were 2 p-dimethylamino-styryl-6 methylquinoline methochloride and methiodide (sterilizing concentration in both media, 1 in 100,000 to 1 in 200,000). The occurrence of long zones of inhibition between concentrations which permit of active growth and those which sterilize completely is a feature of this group of compounds. In no case did the presence of serum cause a marked decrease in antiseptic power for either organism.

The toxicity of several compounds of the series was tested for mice; the tolerated dose was 1 c.cm. of 1 in 5,000 to 1 in 15,000 dilution for animals weighing 20 grams. Where lethal doses had been given there were no characteristic lesions in any organ.

The methochloride and methiodide of 2 p-dimethylamino-styryl-6 methylquinoline and the ethochloride and ethiodide of 2 p-dimethylamino-styryl-quinoline were tested on mice infected with *Tryp. brucei;* but with the maximal doses tolerated there was no effect on the course of the infection.

The chemical variations in the series involve merely alterations in side-chain substituents, apart from the pyridine compound. The substitution of a simple pyridine nucleus for a quinoline nucleus caused slight reduction of antiseptic power. Alterations in the side-chain occupying the 6- position are not very marked in their effect; the 7-amino derivative does not differ significantly in its action from those substituted in the 6- position.

Thus it is shown that substances belonging to the group of styryl-quinoline compounds are very powerful antiseptics.

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* This work was done with the support of the Medical Research Council.

A REPORT received by the United States Public Health Service at Washington shows a remarkable reduction in the infant mortality rate in Springfield and Campbell Townships, Green County, Missouri, since the establishment of a whole-time county health department. In 1918 the infant death rate in these two townships was 105 per 1,000. The county health department was organized that year. In the following year the infant death rate in the two townships dropped to 96 per 1,000. In 1920 it was 85, in 1921 it was 76, and in 1922 it was 61. This reduction of 42 per cent. in four years is regarded as a striking example of what may be accomplished in infant welfare by carrying out, with economy and efficiency, a well balanced general programme of health work affecting all age-sex groups in a community with a well administered health department under the direction of a whole-time health officer.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

INCONTINENCE OF URINE AFTER CHILDBIRTH.

A DISTINGUISHED gynaecologist has recently deplored his inability to cure the troublesome incontinence of urine which sometimes follows childbirth, especially when instrumental delivery has been required. It would therefore seem opportune to draw attention to the value of electricity in this condition, where the patients are much annoyed by the escape of urine when coughing or laughing, or, indeed, on any sudden movement.

After considerable experience of such cases I can confidently commend a continuous current of 3 to 5 milliampères passed for three to five minutes through an appropriate copper electrode introduced into the urinary canal, and repeated on alternate days over a period of one or two weeks. The condition occurs also in unmarried women, and the same method of treatment is here equally and even more rapidly successful.

Glasgow. W. F. SOMERVILLE, M.D.

CYANOSIS DURING OPERATION, DUE TO A MEMBRANOUS EPIGLOTTIS.

I WAS recently removing the tonsils of a woman, aged about 30 years, and had just taken out the left one, when the patient's breathing became very difficult, and she gradually became completely cyanosed. This was remarkable in the circumstances, because the jaw was well forward the whole time, the head back, and the tongue held out of the mouth by the anaesthetist with a sharp pointed tongue clip. Very little blood had escaped into the pharynx, and none had been allowed to accumulate; swabbing over the larynx produced only a little blood-stained mucus. The anaesthetist, Dr. B. B. Sharp, had withheld any further anaesthesia while it was still quite light, owing to the fact that the breathing seemed somewhat laboured. The heart and lungs had previously been examined and found normal.

Artificial respiration had the effect of forcing a little residual air out of the chest, but there was no re-entry. Instead of improving under this treatment, the patient grew worse. At this point I examined the larynx with the finger, and found that the epiglottis was entirely devoid of cartilage, and was of the consistency of a soft piece of wash-leather. It was lying right over the larynx and in tight contact with the posterior pharyngeal wall, to which it was adhering by means of sticky mucus. It was thus acting as a valve, permitting a little air to escape from the chest but none to enter. On hooking the epiglottis forward with my finger, the patient took several deep breaths and became quite pink again.

It would have been quite possible to grasp the epiglottis with a tonsil volsellum and hold it forwards, but as the presence of such an instrument in the mouth for other purposes than its own renders the removal of a tonsil and the tying of the vessels very difficult, I continued the operation without artificial aid, stopping at intervals to hold up the epiglottis whenever the respiration became laboured.

It is possible that some unexplained deaths under anaesthesia may be due to this cause, which may have remained undiscovered *post mortem*, for I notice that the consistency of the epiglottis is not then usually examined. Even if it were, its valve-like action in preventing respiration might not be apparent after death.

I should like to suggest that, in every case where otherwise unexplained dyspnoea occurs during anaesthesia, the larynx be examined digitally; as I am quite sure that had this not been done in this case immediate tracheotomy would have been necessary, and, as it happens, effective. But it is not desirable to perform tracheotomy without a demonstrable and irremovable cause for obstruction in the larynx, pharynx, or mouth; which makes such an examination all the more necessary.

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Reviews.

THE COMMON NEUROSES.

DR. ROSS is to be congratulated on having produced in his book on *The Common Neuroses*[1] a volume handy in size and essentially readable in style, wherein the practitioner may find a useful guide to the treatment of many of his patients. Here are no abstruse discussions of psychological theories, no bewildering confusion of psychological terminology, but a plain statement of experience which anyone can understand. After an informing introductory chapter psychological views as to the etiology of the neuroses are briefly and simply discussed. Stress is rightly laid on the emotional reactions of the patient and a clarifying distinction is drawn between the neuroses and the psychoses. A simple, and therefore acceptable, classification is given into neurasthenia, hysteria, and the compulsion neuroses. The symptoms and diagnosis of neurasthenia are next considered in two chapters, which are short but full of wise observation, and fruitful in practical deductions. The general treatment and the treatment of special symptoms are next carefully described, and it is well to note that there is nothing here which is not within the competence of any general practitioner to carry out, given only the necessary time and patience.

The Freudian method is discussed, and while the author pays a deserved tribute to Freud for his pioneer work the dangers of the method of psycho-analysis and its possible therapeutic shortcomings are pointed out. It is especially interesting to note the importance attached by the author to the value of work, and he is equally right in dismissing as a grossly exaggerated factor the excuse of overwork as a cause of the neuroses.

The author's treatment of the subject of hysteria is practical and the negativism of the hysteric is emphasized. We are interested to note that he is no believer in the reflex paralysis of Babinski and Froment, of which so much was heard during the war; thus does he confirm the suspicions with which this doctrine was received by many, who, however, hardly felt equal to contradicting authorities so eminent. Dr. Ross favours the removal of the somatic symptoms of hysteria, such as paralysis, by direct suggestion coupled with explanation, and wisely insists on the importance of the physician being in a position to devote enough time to his first sitting. This treatment is, however, preliminary to the treatment of the underlying mental state, a matter of greater difficulty.

The book as a whole may be commended as a sane and balanced exposition of the views of one of wide experience. No doubt it will not find favour with those whose ideas are firmly set in one or other special psychological groove, but the student may learn a great deal from its pages and be grateful to Dr. Ross for clarifying much that has been made obscure. There are scattered throughout the book such *obiter dicta* as "Beware of praise from the hysteric," which add to the interest of the text and impress its lessons on the reader.

A TEXTBOOK OF MIDWIFERY.

DR. FITZGIBBON has followed the example of his two immediate predecessors in the Mastership of the Rotunda Hospital in publishing a book on midwifery. As the name, *Practical Midwifery*,[2] indicates, he deals mainly with the practical aspects of the subject. Had he done so exclusively the book might have been more useful to the class of readers it addresses; his descriptions of the early ovum and placentation are so abbreviated that one not already familiar with the subject may find it very difficult to follow.

Dr. Fitzgibbon deals very fully and elaborately with the whole subject of normal pregnancy and labour. In his introduction he states: "Ninety per cent. of cases will be found to be normal, and interference will result in

[1] *The Common Neuroses: their Treatment by Psychotherapy.* By T. A. Ross, M.D., F.R.C.P.E. London: Edward Arnold and Co. 1923. (Demy 8vo, pp. xi+256. 12s. 6d. net.)

[2] *Practical Midwifery.* By Gibbon Fitzgibbon, M.D., B.Ch., B.A.O.Dub. Univ., F.R.C.P.I., L.M., Master, Rotunda Hospital, Dublin. London: J. and A. Churchill. 1923. (Demy 8vo, pp. 534; 175 figures. 16s. net.)

perversion of the normal process; thus the number of cases capable of being damaged is nine times greater than if every case was left without interference." Though the construction of this sentence is open to criticism, its meaning is apparent, and it states a truth which, almost more than any other in practical obstetrics, requires emphasis at the present day. The remaining chapters are devoted to the different pathological conditions met with in pregnancy and labour. In regard to treatment, Dr. Fitzgibbon restricts himself to the methods which he personally employs at the Rotunda Hospital, and while this may simplify the matter for his students, it detracts from the value of the book to the more general reader, and prevents it from being regarded as a full discussion of the subject.

We turn with special interest to the chapter on pre-eclamptic toxaemia and eclampsia and find, as was to be expected, a very full, interesting, and detailed account of the method of treatment of this serious complication, which has been so successful in the hands of Dr. Fitzgibbon and his immediate predecessors, and is now being adopted and imitated throughout Great Britain. For this chapter alone, if for no other reason, the book is well worth possessing.

The dogmatic attitude, to which we have already referred, makes it inevitable that we should find ourselves at variance with Dr. Fitzgibbon in regard to some points of treatment. Thus, for example, it is disappointing to find him referring to manual rotation of the head in occipito-posterior positions in a very half-hearted sentence, which seems to suggest that any such attempt is foredoomed to failure. He devotes half a page to the extraction of the head by forceps as a face-to-pubes case, but to those familiar with the technique of manual rotation or rotation by forceps, delivery as a face-to-pubes case seems a confession of failure. Again, in discussing the mechanism of labour, Dr. Fitzgibbon states that "when labour sets in the vertical axis of the uterus shortens . . ." This is no doubt a slip due to insufficient revision, of which there are several other examples. Is not dogmatism carried rather too far when it is said that "When albumin is found in the urine of a case with any type of accidental haemorrhage, the necessity of laparotomy as the only treatment must be accepted from the first, and the patient moved to suitable surroundings"?

Our object, however, is not to seek for faults in the book, and it is a pleasure to recognize this volume frankly as a useful contribution to the subject of practical obstetrics, and as a full statement of the methods which are at present the routine in one of the most famous maternity hospitals in the world.

PREDISPOSING CAUSES OF PHTHISIS.

DR. PASSINI, director of the principal criminal sanatorium for tuberculosis in Italy, has published the first of a series of studies on some modern and important practical questions relative to diseases of the chest.[3] His object is to make known certain deductions from his twenty years' experience, which he regards as indispensable to those who have not devoted their whole activity to the subject; and further to explain some personal views on the physio-pathology of the disease. Mention is made of the symptoms that should lead the physician to suspect that a patient is the subject of tuberculosis. In addition to these, an examination for tuberculosis is, he considers, desirable when the symptoms of any of the following conditions are present: Hyperthyroidism, hypoadrenalism, the solar plexus syndrome and mucous entero-colitis, hypohepatism, pancreatic diabetes, and erythema nodosum. Pulmonary tubercle deviates frequently from its normal type, and a suspicion of its presence should arise when symptoms of the above-named diseases are present.

In describing the physical signs stress is laid on Baccelli's scapula sign (diminished mobility of the scapula on the diseased side) and on the presence of enlarged and tender glands in the axilla or neck, on one side of the body. In many cases the diagnosis is concerned with the activity or quiescence of the disease rather than its presence. The presence of numerous bacilli in the sputum constitutes a presumption of activity, but is not decisive, since the extension of the disease may be limited by a barrier of fibrous tissue. Nor is the occurrence of haemoptysis decisive, because a cirrhotic lung may give rise to haemorrhage through occasional congestion. The temperature affords the most reliable evidence of quiescence; if during and after walking no rise of temperature occurs it may be assumed that the lesion is inactive, and even with a rise of temperature if this returns to the normal within an hour quiescence is probable.

The author has no doubt that pulmonary tuberculosis is curable in the anatomical sense. Autopsies show that tubercle is commoner than was supposed, that it may have an absolutely latent course and undergo spontaneous cure, and that the cases usually seen probably represent the graver and less curable forms. Dr. Passini considers that it is legitimate to speak of a pretuberculous stage—that is to say, a stage of incubation—and he enumerates its signs and symptoms. Two chapters are devoted to the relation of hepatism and the circulation to tuberculosis. It is held that hepatic insufficiency in its milder degrees is an indirect cause of tuberculosis, and that successful treatment of the condition may in some cases ward off tubercle in its earliest stage.

THE GROWTH OF CELLS.

IN a monograph[4] issued from the Institute of Physiology of the Faculty of Medicine of Strasbourg, MM. E. LE BRETON and G. SCHAEFFER have attacked the problem of the growth of cells along biochemical lines, and have studied the relation between the total nitrogen and the purin nitrogen content of embryos during the first few weeks of development. The variations between the size of the nucleus and the size of the cell during early embryonic development have been studied by several morphologists, but, as the authors point out, a morphologist is confined to two dimensions in such studies, and therefore the biochemical line of investigation offers obvious advantages. The book commences with a history of the various investigations which have been made to determine what proportion of an animal's tissues consists of living protoplasm and what proportion serves merely as a food store. The study of starving animals has yielded remarkable results in this connexion, and Rübner has concluded that in addition to the food stores of fats and carbohydrates, about half of the protoplasm of cells can also act as a food store. In a starving animal about half the protoplasm of the cells can be removed without the destruction of the cells. Special attention has been given to muscle cells, and it has been shown that though in starvation the muscles undergo enormous wasting, there is no destruction of any of the muscle fibres. Measurements of the muscle cells have shown that in a starving animal the individual muscle cells may be reduced to as little as one-fourteenth of the volume of the muscle cells of a fat animal. These and other facts are adduced to establish the clear distinction that exists between that portion of cell protoplasm which is essential to cell life, and the remaining protoplasm or paraplasm.

The nucleus is the most important part of the essential protoplasm, and the authors have measured the purin content of tissues to get an indication of the mass of nuclear material; the total nitrogen less the purin nitrogen is taken to indicate the mass of non-nuclear protoplasm.

The authors of the monograph now before us used hen's eggs, pig embryos, and mouse embryos, and made in each case estimations of the relation between the mass of nuclear material and mass of non-nuclear protoplasm during the first few weeks of development. From the figures thus obtained they have produced curves showing the variations in the ratio, and also the rate of increase of the various substances estimated. Their chief conclusions are that during the course of foetal development the ratio of mass of nucleus to mass of cytoplasm decreases steadily and the rate of decrease follows a regular curve. The rate of decrease is

[3] *Il Libro della Tuberculosi.* Serie 1a. By Dr. R. Passini. Bologna: L. Cappelli. 1922. (Med. 8vo, pp. 274. L 25.)

[4] *Variations Biochimiques du Rapport Nucléo-Plasmatique au Cours du Développement Embryonnaire.* By Éliane le Breton and G. Schaeffer. Recherches de physiologie générale sur la détermination de la masse protoplasmatique active. Paris: Masson et Cie. 1923. (Roy. 8vo, pp. 197; 16 figures. Fr. 15.)

greatest at the commencement of life, and becomes less as development proceeds. The rate of fall in the ratio is greatest in those animals with the shortest foetal life.

It is pointed out that these general laws suggest many interesting applications. The rate of growth of cells is apparently determined largely by the ratio between the mass of the nucleus and the mass of the cytoplasm, and anything which increases this ratio should act as a stimulant to cell growth. Starvation is the most obvious way in which this ratio can be increased, and starvation appears to stimulate cell growth as an after-effect, for if the growth of an animal is temporarily interrupted by starvation, growth is accelerated when feeding is resumed, and the animal temporarily starved may finally outstrip control animals.

Finally, there appears to be a possibility that research along these lines may throw some light upon the causation of the abnormal growth occurring in malignant tissues.

The possible applications of the method described are, of course, matters of speculation, but the writers appear to have rendered an important service by obtaining a basic series of facts which should serve as the foundation to many interesting studies upon the nature of the process of growth.

BRAIN ABSCESS.

DR. EAGLETON'S book on *Brain Abscess*[5] is a record of personal experience in thirty-one cases, but he has also studied and analysed the clinical and statistical records of 125 cases of cerebellar and 145 cases of frontal lobe abscesses. From this combination of material the treatment of brain abscess has been considered; considerations based on surgical pathology have served as the guide to much of the surgical treatment.

Chapter II deals with the general surgical technique of intracranial operations, but we are frankly disappointed with the information it conveys. In such a highly specialized monograph as this is intended to be, details of technique are expected, but the subject is dismissed in a somewhat curt fashion. For example, the directions for ventricular puncture are altogether inadequate. The chapters which deal with surgical pathology are more helpful. The author has adopted a terminology which as yet is unrecognized by other authorities. Depending upon the mode of entry into the brain of the different infections which cause brain abscess, he uses the terms "adjacent" or "secondary," and "intermittent" or "tertiary." This nomenclature seems unnecessarily complicated and the terms do not appear to us etymologically correct.

Perhaps the most interesting part of the volume is the author's argument that from certain definite points of extracerebral origin cerebral abscess will occur in correspondingly definite cranial sites. So much does this view influence him that he believes the principle to be one of great importance in diagnosis. The diagnosis of the location of the abscess is described from the standpoint of where the intracranial pathological process will be with a given mode of entry rather than from that of the presence or absence of neurological symptoms produced by the lesion. This teaching has dangerous elements, and it is unlikely that it will receive the blessing of neurologists.

The volume is really the record of the experience of a surgeon who has done his best to recognize and to treat the different problems of intracerebral suppuration; as such it will repay careful perusal, but it is not to be accepted as expressing the considered opinion of the majority of surgical observers. The addition of some anatomical illustrations would have materially enhanced the value of the book.

ANAESTHESIA.

IN his handy little monograph, *Practical Anaesthetics*,[6] Dr. CHARLES F. HADFIELD has as his object, "to give to the medical and dental student and practitioner theoretical and practical information sufficient to enable him to give anaesthetics for all usual operations." He begins with a short chapter on the history of anaesthetics and then deals with such matters as vomiting, delayed chloroform poisoning, examination, and after-treatment. Next he describes signs and stages of anaesthesia, alkaloids used preparatory to induction, the airway and automatic respiration. Chapters follow on nitrous oxide, nitrous oxide with air or oxygen, and nitrous oxide in minor and major surgery. Attention is then directed to ether, Clover's inhaler, mitigated ether, open ether, ethanesal, warm ether vapour, and rectal, endotracheal, and intravenous ether. Passing next to chloroform, its physiological action, the Vernon Harcourt inhaler, open methods, and the Junker inhaler are described in turn. A chapter follows on A.C.E. and similar mixtures, and is succeeded by others on ethyl chloride, spinal anaesthesia, anaesthesia in children, and on some special operations and diseases. The work is brought to a close by a chapter on anaesthetic accidents, emergencies, and shock.

Careful perusal of the volume brings us to the conclusion that the author has succeeded in the task he set himself. While, of necessity, somewhat dogmatic in his statements, as is but natural in a short textbook on a by no means simple subject, his teaching is sound and his exposition clear and interesting. He has not made the mistake of overloading his text with many illustrations of complicated apparatus, and in the few cases in which apparatus is figured the descriptions are simple, those seeking fuller information being referred to appropriate monographs. The printers have done their part of the work well, paper, type, and binding being all that could be desired. The book can be confidently recommended to the student and general practitioner in search of a brief, sound, unbiased exposition of current practice in the art of anaesthesia, not involving the use of complicated and expensive apparatus.

A FRENCH CYCLOPAEDIA.

THE fifth of the twenty-two volumes of ROGER, WIDAL, and TEISSIER'S *Nouveau Traité de Médecine*[7] is divided into two portions, the first of which deals with the infectious and parasitic affections, almost entirely tropical, left over from the previous instalment. The first two articles, on soft chancre and ulcerating granuloma of the pudenda, are contributed by Dr. R. Demanche, who gives due credit for the original description of the latter disease to Conyers and Daniels twenty-six years ago, and refers to the recent therapeutic use of emetine for its cure. Goundou, first described by the late Professor Alexander Macalister of Cambridge under the title of "The horned men of Africa," is discussed by Dr. Joyeux, who leaves open its relation to yaws, also summarized by him in the next article. Drs. Nicolle and Blaizot, of the Pasteur Institute of Tunis, write on relapsing and tick fever, and Dr. Thibaut on sodoku, more familiarly known as rat-bite fever. Malaria occupies a hundred pages, containing many charts, in some of which illustrations of the form of the parasites present at the various phases of the paroxysm are reproduced at the bottom of the graph, thus bringing out the parallel evolution of the parasite and of the temperature. This important article and that on haemoglobinuric fever have appropriately been contributed by Drs. H. Vincent and J. Rieux of the French Army. Among the articles on the parasitic diseases attention may be called to those on hydatids and cysticercus by Dr. F. Dévé of Rouen, who has so specially devoted himself to the subjects. Professor E. Brumpt's descriptions of human trypanosomiasis and bilharziasis are illustrated by a number of original figures.

The second and considerably the larger part of this work is devoted to an authoritative account of malignant disease in all its aspects by Professor Gustave Roussy, who is so widely known as an expert neurologist, and Dr. Maurice Wolf of Paris. This is indeed a most valuable monograph, combining a critical survey of our knowledge with the

[5] *Brain Abscess: Its Surgical Pathology and Operative Technic.* By Wells P. Eagleton, M.D. New York: The Macmillan Co. 1922. (Med. 8vo, pp. xix + 297; 40 figures. 31s. 6d. net.)

[6] *Practical Anaesthetics for the Student and General Practitioner.* By Charles F. Hadfield, M.B.E., M.A., M.D.Camb. London: Baillière, Tindall, and Cox. 1923. (Demy 8vo, pp. x+244; 32 figures. 7s. 6d. net.)

[7] *Nouveau Traité de Médecine.* Published under the direction of Professors G. H. Roger, Fernand Widal, and P. J. Teissier. Secrétaire de la Rédaction, M. Garnier. Fascicule V, Maladies infectieuses et parasitaires (fin)—Le cancer. Paris: Masson et Cie. 1922. (Roy. 8vo, pp. viii + 784; 35 figures, 4 coloured plates. Fr. 50.)

results of much personal research. A welcome feature is the space devoted to the comparative pathology of malignant disease in animals.

ST. BARTHOLOMEW'S HOSPITAL REPORTS.

THE second part of this year's volume of *St. Bartholomew's Hospital Reports*[8] opens with an admirable and sympathetic obituary notice of the late Sir Norman Moore, illustrated by a full-page portrait of the late President of the Royal College of Physicians. Dr. Ormerod, his colleague both at the hospital and at the College of Physicians, writes with personal touches drawn from their many years of companionship. He mentions that if Moore thought the patient (or others) too curious about the diagnosis of a case in the wards it was written at the head of the notes in Irish; as teacher and lecturer Sir Norman Moore attracted students by making even the most commonplace cases interesting. Full justice is here done to the learning, wit, and versatility of "a man singularly responsive to all human interests." Mr. Girling Ball contributes a good account of diverticulum of the urinary bladder based on two cases without any obstruction to the outflow from the bladder, which were successfully treated by radical surgical measures; he concludes that whether associated or not with obstructive lesions in the bladder and urethra the origin is the same—namely, some defect in the bladder wall, either a gap in the musculature or a deformity resulting from the persistence of a portion of the urachus or an accessory ureteric bud. Acetonuria and its relation to surgical operations was investigated by Mr. G. H. Caiger in 76 cases, of which about 40 per cent. had post-operative acetonuria, sex having no influence. From these cases and from observations on himself he finds that diet is the only important factor. The remainder of the volume is devoted to a series of lectures given in the winter session on syphilis from different aspects. Its history from the earliest times to the present day is sketched with his usual charm by Sir D'Arcy Power. Mr. John Adams draws on his experience at Thavies Inn Clinic for his account of the ante-natal and post-natal disease, and Dr. Branson deals in a temperate manner with its bearing on life assurance. The nervous lesions are described by Dr. Hinds Howell, and Colonel L. W. Harrison has contributed from his experience his views on prevention.

NOTES ON BOOKS.

F. FRANÇON and J. HUTINEL'S monograph *Les hépatites amibiennes, autochtones et coloniales*[9] was inspired by their teacher, Professor Chauffard, who contributes a short preface, and by their war experience in Morocco and with the Second Army. The occurrence of amoebiasis in France among people who had never been abroad was recognized before 1914, but became more noticeable after the war. This monograph is rich in references to the work of others and full justice is done to British writers and especially to Sir Leonard Rogers. After a brief sketch of the history of amoebiasis since the *Entamoeba histolytica* was discovered, the various forms of amoebic hepatitis are tabulated and described—namely, pure and mixed infection, such as with bacillary dysentery, malaria, and tuberculosis; acute, subacute, and chronic inflammation and suppuration. The predominating influence of emetine on the clinical picture, prognosis, and treatment is forcibly brought out, and it is well said that the prognosis of amoebiasis depends on its diagnosis. It is remarkable how rare it is, even with Widal's haemoclasic test, to find evidence of hepatic insufficiency in amoebic hepatitis. The indications for surgical intervention and for medical treatment are given, and of the three forms of medical treatment—emetine alone, 914 alone, or these two combined ("ENV")—the last is said to be that now in popular favour. The toxic effects of these remedies are wisely pointed out, and the causes of failure of emetine in certain cases are discussed. This compact little work contains a great deal of recent information and will serve as a useful source of reference.

[8] *Saint Bartholomew's Hospital Reports*, vol. lvi, part ii. London: John Murray. 1923. (Pp. 95-198; 3 illustrations.)

[9] *Les hépatites amibiennes, autochtones et coloniales et leur traitement.* Par F. Françon et J. Hutinel. Paris: Gauthier-Villars et Cie. 1923. (Roy. 8vo, pp. 131. Fr. 10.)

MRS. GASQUOINE HARTLEY'S little book on *The Mind of the Naughty Child*[10] is the fifth volume of a series entitled "The Blue Booklets," which consist of "plain talks on vital topics of the day." In very simple language the author, who is obviously permeated with Freud's doctrines, discusses the causes underlying the various forms of naughtiness in children, dealing successively with the bumptious, boastful, and violent-tempered child, the sulky child, the jealous child, the destructive child, the inquisitive child, and the lying child. The book will interest parents.

With the holiday season in full swing what better time could there be for the appearance of Mr. G. R. STIRLING TAYLOR'S *Oxford: A Guide to its History and Buildings*,[11] for probably all wise people go to Oxford or Cambridge, and if they cannot stay there for three or more years require some kindly help in getting to know the spirit of the place? Of guides there are several kinds; some are full of accurate dates and details, while a few, wisely casting aside all pretence at omniscience, tell the story with the happy knack of exciting appetite for more. Of this more excellent type Andrew Lang's *Oxford: Brief Historical and Descriptive Notes* was a good example, and Mr. Stirling Taylor's book follows the attractive lead in giving as the first of its three parts the outlines of the history which the reader is advised to study before setting out on his voyage of sight-seeing. The second part—an itinerary of Oxford in historical order—is to be read *en route* with reference to the notes and illustrations contained in part three. The illustrations are admirably produced and the comparatively low price of this attractive handbook is noteworthy.

[10] *The Mind of the Naughty Child.* By Mrs. Gasquoine Hartley. London: A. M. Philpot, Ltd. 1923. (Cr. 8vo, pp. 90. 2s. 6d. net.)

[11] *Oxford: A Guide to its History and Buildings.* By G. R. Stirling Taylor. London: Longmans, Green, and Co. 1923. (Cr. 8vo, pp. 125; 25 plates, 1 map. 4s.)

APPLIANCES AND PREPARATIONS.

Card Index System of Book-keeping and Case-taking.

WE have received from Messrs. H. K. Lewis and Co., Ltd., 136, Gower Street, W.C.1, particulars of their card index system with specimen cards. These are four in number—an account card, a case card, a plain card for continuations, and a temperature card. The account card is ruled for twelve months of thirty-one days with a series of three money columns following, and a column for the date on which the account was sent. It can thus be made to serve both as day-book and ledger. At the head of the case card are spaces for the name and address of the patient, and particulars as to age, sex, married state, occupation, and date. The rest of the card is plain. The temperature card is of the ordinary chart type, with both Fahrenheit and Centigrade scales indicated. All the cards are of the same size—the same width as an insurance record card and about an inch longer—8 in. by 5 in. Card index systems are in increasing use, and this is a particularly convenient and useful one for the methodical practitioner who is at the same time busy and careful. A cabinet is supplied for holding the cards; they can be perforated for use also in a holder, the cards for the day's round, if wanted, being taken from the drawer and placed in the holder and put back at the end of the day. The cards are of suitable thickness and surface for easy writing, and the prices appear reasonable. Messrs. Lewis state that specimens will be sent to any medical practitioner on application.

A Protein-Iron Preparation.

Messrs. E. T. Pearson and Co., Ltd., have produced from edestin a compound for medicinal use containing 10 per cent. of iron in the ferric state, which is sold under the name of "Protoferrin Brand Organic Iron." Edestin is a vegetable protein occurring plentifully in the seeds of flax, hemp, and cotton, and is manufactured by Messrs. E. T. Pearson for use as an accessory to the diet of mothers during lactation. It belongs to the group of proteins characterized by solubility in water containing about 15 per cent. of ammonium sulphate and by insolubility in water saturated with the same salt. It is also soluble in a solution of sodium chloride. The chemical union of iron with a digestible protein offers an interesting subject for study in therapeutics. It is contended that the exhibition of iron in this form gives all the advantages to be derived from treatment with iron, without the risk of the astringent action and constipative effect experienced with ordinary iron compounds. An analysis made at our direction has verified the correctness of the constitution ascribed to Protoferrin Brand Organic Iron, and physiological tests are also reported to have been made with satisfactory results. This compound may prove to be a very useful addition to the resources of prescribers.

LONDON'S WATER SUPPLY.

THE Metropolitan Water Board's seventeenth annual report, by Sir Alexander Houston,[1] for the year ending March 31st, 1923, is notable for its full introduction, in which a vivid and most interesting account is given of the whole water scheme of the metropolis. The story is clearly a labour of love on the part of its author, who sedulously avoids technicalities of language which might repel a reader without scientific knowledge. It is intended for "people of all classes," who "are now taking a real interest in water and are wanting to know much more than previously of rainfall, sources of supply, methods of purification, and means of distribution."

The supply is for nearly seven million persons, covering over 537 square miles in six administrative counties. Four-fifths of the water is drawn from polluted rivers, and yet London is one of the healthiest cities in the world. The daily average supply is 250,000 million gallons, of which three-fifths come from the Thames, one-fifth from the Lee, and one-fifth from deep wells. It is distributed by 6,577 miles of pipes, and over 43,000 horse-power is needed for its collection and distribution.

Deep Wells.

Deep wells are the purest source, situated in Kent and the Lee valley, and though the water is hard the bulk of it needs no treatment. Three of the wells, however, are so situated or contain such chemicals in solution as to require filtration or chlorination or both. Deep well water is clear, sparkling, and pleasant to drink, with few bacteria or microbes of any sort, and its hardness is not regarded as harmful. Of the (in round numbers) 40 million gallons daily from deep wells in Kent and the Lee valley, 10 millions are not supplied directly, but are pumped into the Lee or New River, and pass through their filters. Sir Alexander Houston says that the supply from the deep wells, even omitting what is pumped into the Lee, would suffice to supply Birmingham at the rate of 35 gallons per head per day. That is a kind of illustration he is fond of as a convenient measure of the greatness of the scheme.

River Sources.

The Water Board is not the conservancy authority, and so has no control over pollution of the Thames and the Lee. Its functions begin with the intakes. The Thames, though polluted, is partly or largely self-purifying, and in summer, when the level is low, many sources of pollution fail to reach it above the intakes.

The New River is a diversion of the waters of the Upper Lee into an artificial channel nearly thirty miles long. It is the purest of the river sources, but the storage reservoirs are small and the filtration area limited, so that up to a few years ago the winter floods used to cause deterioration of the supply, and chlorination before filtration often gave the water an appreciable chlorine taste. Difficulties, however, have now been overcome, and the only remaining trouble is vegetable growths, which in warm spring weather may interfere with the flow and block the sand filters, so that rapid mechanical filters are now being experimented with. In fact, during the whole year now a high standard of purity is reached. The New River itself would suffice to supply the water needs of Liverpool or Manchester at 35 gallons a head per diem.

The River Lee.—Izaak Walton's river is not too pure, but the reservoirs, which in total area amount to lakes, purify by sedimentation, and there is also slow sand filtration. The Lee yields over 30 million gallons a day, and would meet the needs of both Sheffield and Bristol at 35 gallons a head per diem.

The Thames.—This great river provides about 150 million gallons per day, and at the 35-gallon standard would supply half a dozen great cities — Glasgow, Birmingham, Manchester, Liverpool, Sheffield, and Bradford. The water is all filtered, nearly all is stored, and half is chlorinated excepting in floods. The reservoir capacity is over 7,000 million gallons, and is being doubled. Before the war 70 to 80 million gallons were pumped daily for purification by reservoir storage, but the cost of coal and its scarcity in the war led to the substitution of chlorination, and that has been so effective as to be still continued. The coal saving last year was £21,000, and this year will be over £16,000. The dose of chlorine is very minute—barely one part in two millions—but in respect of bacteria it improves the water a thousand times. In high floods the process is discontinued, and water long stored in Staines Reservoir is supplied instead. About half the water supply from the Thames is not chlorinated, but purified by storage and slow sand filtration at Southwark, Vauxhall, Chelsea, and Lambeth. Long stored water does not block and involve renewal of filter beds, as raw water does. Filtering of water from Walton Reservoir can go on for months instead of for weeks without requiring attention. Storage also slightly softens water, and so would save soap if the fact were domestically recognized.

Sir Alexander Houston concludes his graphic picture of London's water supply by asking his readers to conjure up a vision of vast underground lakes feeding surface rivers; of deep wells of great purity; of imperfect sources of supply purified either in enormous artificial lakes covering 2,000 acres and holding nearly 13,000 million gallons, or by chlorination; and of water finally delivered to consumers after slow sand filtration.

[1] London: P. S. King and Son, Ltd., 4, Great Smith Street, Westminster. (Fcap. 4to, pp. 90; with plates and diagrams. 15s. net.)

INTERNATIONAL DENTAL FEDERATION.

THE second annual meeting since the war of the International Dental Federation was held at the Sorbonne, Paris, from August 6th to 10th. The meeting was opened by M. Maunoury, Minister of the Interior, in the absence of the Premier, M. Poincaré, who was unable at the last moment to attend.

The Minister of the Interior was supported by Dr. Truman W. Brophy of Chicago, President; Mr. W. B. Paterson of London, Honorary President; Messrs. Blatter, Georges Villain, M. Roy, and Professor Viau, of Paris; Messrs. J. H. Mummery of London, Walter Harrison of Brighton, and Professor Gilmour of Liverpool, Dr. W. Guy and Mr. J. A. Amoore (President-elect of the British Dental Association) of Edinburgh, Dr. Florestan Aguilar of Madrid, the Secretary-General, Dr. Wheeler of New York, Dr. Dubeau of Montreal, Dr. Edward C. Kirk of Philadelphia, Dr. Potter of Boston, U.S.A., and many others.

Dr. Aguilar, the Secretary-General, described to the meeting the terrible state of poverty and starvation in which he had found many of the once leading dentists of Petrograd and Moscow; and as a result of a visit to those cities during the past winter he had, in the name of the Federation, advanced several hundred pounds to be distributed to dentists through the Committee of Dr. Nansen's fund.

The President of the Federation detailed the work of the Federation since its last meeting, and made reference to the possibility of some financial co-operation with the Rockefeller and Carnegie Trust funds for the purpose of spreading abroad generally the considered opinions of the Federation on dental education and dental hygiene. M. Maunoury eulogized the work of the medical officers of the public health service in France. Their work was conducted, he said, under great difficulties of public finance owing to the results of the war, but nevertheless it was conducted with efficiency and economy, and under it he included such public dental services as were possible. More, he said, might be expected year by year as the country improved in prosperity, and on behalf of himself and the Minister of Health he promised that the public health should continue to occupy a first place in all Government measures. From professional bodies, like the Federation, ministers and Government departments welcomed on all occasions counsel and advice. At the conclusion of the Minister's remarks, the representatives in the Federation of some fourteen nationalities made short speeches, chief among which was the speech of Dr. W. Guy of Edinburgh, representing Great Britain. Dr. Guy's eloquence and its

concluding high note of friendship for France so moved the audience in the theatre of the Sorbonne that the Minister of the Interior left his presidential chair and cordially shook the hand of the speaker amidst great applause.

During the meeting the Miller Memorial Prize, which consists of a gold medal, an illuminated diploma, and a sum of money, was presented to Mr. J. Howard Mummery for his distinguished work in dental histology. In the various commissions, or sectional meetings of the Federation, held during the week progress was made in attempts to arrive at a universal ideal curriculum for dental studies, and a collective investigation into the best means of carrying out public dental service on the most economical basis was also begun. Professor Jersen incidentally referred to a cheap metal plate for a denture which was now in use amongst the many thousands employed in Krupp's factories at Essen. A specimen plate, which he showed, had the appearance of platinum but consisted of very thin stainless steel; five years' use had shown it to be practically unbreakable, and it was not acted upon deleteriously by the oral fluids. Unfortunately, from the professional point of view, the makers of the metal, who were Messrs. Krupp, had refused to divulge the secret of its manufacture. The collection and the documentation of all published matters relating to dentistry, either scientific or general, were proceeding under the skilled guidance of Dr. Huet at the great library of bibliography in Brussels, and it was hoped that at some future date the result would be an important work of reference. A visit to the tomb of Dr. Charles Edouard Godon in the cemetery of Père Lachaise, Paris, one of the founders and an honorary president of the International Dental Federation, who died recently, was made by a delegation of the Federation.

During the meeting various ceremonial functions and entertainments were organized by the French members of the Federation. The meeting terminated in a pleasant excursion by motor car to the country home, near Versailles, of Pierre Fauchard, "the father of French dentistry," who died in 1786.

Nova et Vetera.

TAR WATER.

IF we are a nation of shopkeepers, none of us minds his own shop with an exclusive devotion; the triumphs of the amateur are the glories of England. Charles Darwin was not a professor, George Boole taught himself mathematics, John Dalton was self-educated. These names illustrate the successes of the amateur; his failures are sometimes instructive, and the history of medicine provides many examples. The story of Tar Water is a case in point. In 1744 there was published *A Chain of Philosophical Reflexions and Inquiries concerning the Virtues of Tar Water and divers other Subjects connected together and arising one from another*. It was reprinted the same year with additions and a new title, *Siris* (from σειρά, a chain), and reached a fifth edition by 1748. "We are now," said Horace Walpole, "mad about the water, on the publication of a book written by Dr. Berkeley, Bishop of Cloyne. The book contains every subject from tar water to the Trinity; however, all the women read it and understand it no more than if it were intelligible. A man came into an apothecary's shop the other day: 'Do you sell tar water?' 'Tar water?' replied the apothecary, 'why, I sell nothing else!'"

Our profession vigorously denounced the "epidemical madness of drinking tar water," thus, as some cynics held, justifying Berkeley's claims. But the cynics were wrong; all that remains of tar water in the memory of man is covered by a phrase. "The luminous spirit," said Berkeley, "lodged and detained in the native balsam of pines and firs is of a nature so mild, and benign, and proportioned to the human constitution as to warm without heating, to cheer but not inebriate." Cowper applied the last phrase to tea and made it immortal, the one unrusted link of Berkeley's chain.

What did Berkeley claim for tar water, and why? As to the first question it would be hard to say what he did not claim. To begin, it was a sure prophylactic against small-pox. He knew a family of seven, all of whom escaped "except one young child which could not be brought to drink tar water as the rest had done," while Captain Drape of Liverpool made a solemn affidavit that of "170 negroes seized at once by the small-pox on the coast of Guinea one only died, who refused to drink tar water; and the remaining 169 all recovered, by drinking it, without any other medicine, notwithstanding the heat of the climate, and the incommodities of the vessel" (*Second Letter to Thomas Prior*, par. 18). Tar water was sovereign in cutaneous eruptions and ulcers—"encouraged by these successes I ventured to advise it in the foulest distempers, wherein it proved much more successful than salivations and wood drinks had done." Tar water was also very good for gout, but "nothing is more difficult or disagreeable than to argue men out of their prejudices; I shall not therefore enter into controversies on this subject, but if men dispute and object, shall leave the decision to time and trial."

If it be objected that one and the same medicine cannot possibly cure so many different diseases, we should remember that opposite causes sometimes produce the same effect: "it is not therefore strange that tar water should warm one habit and cool another, have one good effect on a cold constitution, and another good effect on an inflamed one; nor, if this be so, that it should cure opposite disorders."

How did it come about that one of the acutest thinkers of the eighteenth century, familiar—as *Siris* itself proves—with the Hippocratic collection, reasoned so ill? Part of the explanation is that although Berkeley was a fine reasoner, his field was remarkably narrow. Hardly anyone since Plato has been acuter in the use of dialectic, hardly anyone of equal powers has been so destitute of either mathematical or experimental tact. His *Analyst* exhibits a total failure to comprehend the leading ideas of Newton's doctrine of fluxions—of what we now call the infinitesimal calculus; Jurin, who although eminent in both mathematics and physic was a much smaller man than Berkeley, easily vanquished him in the mathematical controversy. A fraction of the skill with which Berkeley dissected the notion of "matter" would have made short work of Captain Drape's solemn affidavit.

But this cannot be the whole explanation. Practical economics are at least as far from dialectics as practical therapeutics, and Berkeley was a much better practical economist than most of his contemporaries, as a few extracts from the *Querist* will prove, thus:

> "Whether the women may not sew, spin, weave, embroider, sufficiently for the embellishment of their persons, and even enough to raise envy in each other, without being beholden to foreign countries?"
>
> "Whether, if drunkenness be a necessary evil, men may not as well get drunk with the growth of their own country?"
>
> "Whether it must not be ruinous for a nation to sit down to game, be it with silver or paper?"

We should suppose the cause of his failure to lie deeper, to be what it is now fashionable to call a "complex," which certainly sounds much wiser than *arrière pensée*. Berkeley's "complex" was a conscious and unconscious wish to smash the "deists." This prompted his successful onslaught on "matter" and his unsuccessful attack on fluxions. He was no doubt worried because, as Lord Balfour said, "ordinary men were not prepared to admit that a Deity was necessary because matter was impossible." If he could but discover a panacea, his argument for Divine Providence would be clinched. Tar water was that panacea, and proofs of its efficiency no more than rationalizations—to adopt another fashionable term for what used to be called argumentation *ex post facto*.

Here perhaps we have the explanation of many other panaceas before and after Berkeley's time, from the elixir of Paracelsus to the *Bacillus bulgaricus*. The physician must be a philosopher, but a simpler philosophy than that of Berkeley may serve his turn better—that of the worldling who said:

> "Virtus est vitium fugere, et sapientia prima
> Stultitia caruisse."

British Medical Journal.

SATURDAY, AUGUST 25TH, 1923.

THE MODERN CONCEPTION OF JAUNDICE.

WITH the passage of time there is often a swing of the pendulum, so that hypotheses that have been abandoned, if not almost forgotten, come again into favour and fashion, though perhaps in a somewhat altered dress on account of fresh data. This has certainly taken place with regard to the classical theories of jaundice. From the time of Virchow's observations on haematoidin, an isomer of bilirubin (1847), the older writers believed in the existence of a true haematogenous jaundice without any biliary obstruction and quite independent of any participation of the liver cells. After 1886 a reaction succeeded Minkowski and Naunyn's experimental removal of the liver in geese, which showed that the jaundice which in control animals followed the administration of arseniuretted hydrogen failed to occur, and thus suggested that the liver was essential for the production of bile pigment. A little later, in 1891, Stadelmann's experiments with haemolytic agents rendering the secretion of bile excessively viscid, and so obstructing the smallest bile ducts and capillaries, led to the view, set out at length by Dr. William Hunter in the first edition of Allbutt's *System of Medicine* (1897), that all jaundice was obstructive, if not in the larger bile ducts then inside the liver.

The notion of haematogenous or haemolytic jaundice was thus discredited until 1911, when it again came to the fore, and since then has inspired a large amount of research work, with a corresponding alteration in our views as to the mechanism of jaundice; much has been done in America, France, Germany, Holland, and in this country. Dr. J. W. McNee, who began work on these lines in 1912, has now, in a critical review[1] of the recent advances in our knowledge of jaundice, given an admirable summary of the whole subject; and, as haemolysis and the metabolism of haemoglobin are so intimately connected with jaundice, it is fortunate that Dr. Peyton Rous[2] of the Rockefeller Institute has provided a comprehensive review dealing with the destruction of the red blood corpuscles in health and disease. According to the more modern view the ordinary polygonal cells of the liver do not form bile pigment from effete haemoglobin; this is carried out by the reticulo-endothelial system, the constituents of which are exemplified by Kupffer's cells in the liver and the haematophages of the spleen. In birds these cells are mainly in the liver, the spleen being small, whereas in mammals and man this distribution is reversed. In confirming the absence of jaundice in hepatectomized geese poisoned by arseniuretted hydrogen Dr. McNee argued that this result was due to removal of the Kupffer's cells, and that the goose's liver contains two categories of cells distinct in function—the endothelial and the parenchymal. The polygonal liver cells, however, appear to play the part of receiving the bile pigment formed by the cells of the reticulo-endothelial system and of passing it on to the bile capillaries after modifying its constitution. To these two functions of the liver cells attention may now be briefly directed.

The French school, and especially Brulé (whose monograph was noticed in our columns),[3] insist that functional disorder of the hepatic cells may result in the bile pigment and the bile salts, one or both, being shunted into the blood vessels instead of into the bile capillaries; the influence of functional disturbance rather than of mechanical obstruction, for example, in so-called catarrhal jaundice, is emphasized. The conception of dissociated jaundice—namely, when bile pigment without bile salts, or vice versa, is retained in the blood—thus arose, and is regarded as characteristic of hepatic insufficiency. In connexion with the changes effected in the bilirubin by the liver cells the test elaborated by Professor Hijmans van den Bergh, now of Utrecht, for the detection of bilirubin in the blood serum, has most important bearings. It shows that there are two forms of bilirubin. One form gives an immediate reaction with Ehrlich's diazo-reagent, and occurs in obstructive jaundice—that is, when the bilirubin has passed through the polygonal cells of the liver and has then been absorbed on account of obstruction; this prompt (or immediate) direct reaction is given by the bile in the gall bladder. The other form of bilirubin gives no colour reaction, or only after a long delay; this is the delayed direct reaction, and occurs in the serum in non-obstructive jaundice, and in haemorrhagic effusions in the chest and abdomen, when presumably the bilirubin, formed by the cells of the reticulo-endothelial system, has not been modified by passage through the liver cells. In addition there is a biphasic reaction, probably due to the presence of both forms of bilirubin in the blood serum, as in some cases of catarrhal jaundice in which there is a combination of obstructive and toxico-infective factors. It should be added that every icteric serum gives an immediate colour reaction with the diazo-reagent after treatment with alcohol—van den Bergh's indirect reaction. Quantitatively van den Bergh's test shows that bilirubin is normally present in blood serum in the proportion of from 1 in 1,000,000 to 1 in 400,000, and that when it reaches 1 in 50,000 bile appears in the urine; below this figure there may be latent jaundice, either haemolytic, as in pernicious anaemia, icterus neonatorum, and helminthic anaemia, or obstructive, as in cirrhosis. In obstructive jaundice the colour of the skin gives no indication whatever of the bilirubin content of the blood serum; for example, in chronic black jaundice the bilirubin content may be much less than early in the course of the disease when the yellow tinge is just appearing.

Dr. McNee divides jaundice into three groups: (*a*) obstructive; (*b*) toxic and infective, by far the largest, in which the van den Bergh test gives variable results, and in which the biphasic reaction was first described; and (*c*) haemolytic. In the toxic and infective jaundice it is probable that both obstruction in the bile passages from cholangitis and damage to the polygonal liver cells play a part, preponderating one way or the other at different times. Into this critical review Dr. McNee, who, it will be remembered, was the first in this country to publish anything about van den Bergh's test, has introduced much of his own work and conclusions, and thus provided a model of what such an article should be.

[1] McNee, J. W.: *Quart. Journ. Med.*, Oxford, 1922-23, xvi, 390-420.
[2] Rous, P.: *Physiological Reviews*, Baltimore, 1923, iii, 75-105.
[3] BRITISH MEDICAL JOURNAL, 1919, ii, 419.

THE HEALTH AND THE INTELLIGENCE AND PHYSIQUE OF SCHOOL CHILDREN.

PROFESSOR KARL PEARSON has many titles to respect, amongst them his prowess as an iconoclast. A secondary definition of the word "iconoclast" is one who assails or attacks cherished beliefs. Even the first iconoclasts of the eighth and ninth centuries did not manage to break all the idols, any more than the Protestants of the sixteenth and seventeenth centuries succeeded in smashing all the images on our churches. Professor Karl Pearson will perhaps be no more successful than his predecessors, but students of medicine and sociology are sincerely grateful to him for now and again asking them to examine critically the grounds of their confident beliefs. The most recent publication of the Galton Laboratory deals with the relationship of health to the psychical and physical characteristics of school children,[1] and is based on information collected between 1898 and 1903 from teachers in a number of secondary and elementary schools. The teachers recorded the measurements of a number of quantitatively defined characters and classified a number of non-measurable characters. The classification of intelligence was based upon a very careful series of definitions of categories supplied by Professor Pearson. A large number of pupils—2,388 boys and 2,290 girls—were examined.

Many of the results deducible from this valuable collection of data have already been published by Professor Pearson, notably in his Huxley Lecture. With regard to the interrelationship of health and psychical or physical characters, he concludes in the first place that there is little or no change either in health or intelligence through school life. Indeed, "vivacity" in boys and "popularity" and handwriting in girls are the only characters furnishing a correlation with growth which exceeds 0.1, the sign in each instance being negative.

Passing to the correlations of the estimate of health with other estimates and measurements, the results are these. The correlation is greater than 0.2 in three instances — with athletic power (0.443), with self-assertion (0.263), with vivacity (0.222). It is between 0.1 and 0.2 in two cases—with popularity (0.199), and with handwriting (0.154). The figures in brackets are the values for boys; for girls the values are somewhat smaller. The order of the probable error is ± 0.015 in each case. Professor Pearson considers that his data "seem to shatter three widely if not universally accepted beliefs. Firstly: General Intelligence and a variety of psychical characters seem practically to be unchanged throughout the whole range of school life. It is not therefore possible for the teacher to modify them. It is the parent, not the teacher, who provides the metal; all the teacher can do is to give it an edge and temper it. Secondly: General health changes exceedingly little during the whole school period. Health and Intelligence are correlated, although not very markedly. While recognizing this association of Health and Intelligence, it does not seem feasible with the present state of medical knowledge to improve Intelligence by modifying Health. In the middle classes, where environmental and medical care of children is the rule, we do not find any appreciable advance in Health during school years. We are forced to recognize that on broad lines Health and Intelligence are innate characters, chiefly determined by inheritance. Thirdly: There appears to be no foundation for the widely spread opinion that Health is a governing factor of temperament."

There will be no difference of opinion as to the value of this exact and lucidly presented analysis of a body of data gathered by experienced observers in many schools. There may be a difference of opinion as to the justice of the remarks quoted. We shall not ourselves take part in this discussion, because Professor Pearson emphasizes the fact that the bulk of his data is drawn from middle-class schools, and, so far as we are aware, it is with respect to elementary schools that opinions resembling what Professor Pearson asserts to be universally accepted beliefs have been at all widely expressed by medical men. We are not, indeed, sure that even in that field it has been asserted without qualification that medical care can modify intelligence. What we think has been universally asserted is that underfed, sickly children suffering from remediable defects—uncorrected errors of refraction, septic mouths, dirty scalps—are not in a state permitting them to profit by the educational advantages proposed in our system of elementary education. This belief, whether true or false, is not shattered by the present analysis.

Professor Pearson writes: "Beneath the ceaseless flow of life the feeble mind of man catches now and again some glimpse of deep biological purpose in the universe; he sees it mid the shifting vortices of the flood only too obscurely. Nature does not work through man but on man; and she works not with his ineffectual tools but with her own all-powerful machinery. She made by variation, by inheritance, and by ruthless extermination the moderately amiable, the moderately intelligent man of to-day out of an untamed and mordacious precursor. Is it not blind audacity for man to claim that by the aid of his puny, if undoubtedly useful, little polishing tools, such as education and medicine, he can achieve as much in a school life as Nature with her omnipotent mechanism has taken in all probability a quarter of a million years to produce? If man would throw himself into sympathy with Nature's purpose, let him appreciate to the full extent the potency of her methods, and endeavour as his slender strength may permit to use her tools." This is finely said, and, in an age of braggarts proclaiming that if only this or that were done disease and sorrow would be banished, the truth it enforces is not very likely to be misused. But metaphors, if good servants, may be bad masters; should anyone conceive "Nature" as a learned lady with the features of Britannia on our pence, study of the Registrar-General's annual returns, and perception of the fact that in 1918, a year of deadly pestilence, the annual rate of mortality which appalled us was within 0.1 per 1,000 of what Farr fifty years before had proposed as a possibly attainable standard, will convince him that the good dame's rate of movement away from Frightfulness has quickened during the past two generations.

When we drop metaphor, we may recollect that all we do and hope is part of "Nature," that confidence in our useful little polishing tools of medicine and education was implanted in us *by* "Nature," and that these selfsame tools also belong to "Nature's" powerful machinery.

[1] *On the Relationship of Health to the Psychical and Physical Characters in School Children.* By Karl Pearson, F.R.S. Drapers' Company Research Memoirs, Studies in National Deterioration, IV. Cambridge: University Press; London: H. K. Lewis and Co., Ltd. 1923. (Med. 4to, pp. 77; 39 diagrams. 15s.)

INSULIN IN AMERICA.

IN the *Canadian Medical Association Journal* for July, 1923, the Insulin Committee of the University of Toronto reviews the therapeutic value of insulin in diabetes, its action, and its manufacture. The now familiar history of the discovery of insulin is summarized, beginning with the experiments of von Mering and Minkowski, who first established the important relationship between the pancreas and diabetes. Attention is drawn to the excellence of the team work, which in the later stages of the investigation in Canada showed such good results in a comparatively short space of time. It is again emphasized that medical practitioners must not conclude that insulin can replace the dietetic treatment of diabetes mellitus, and that the indiscriminate use of insulin in cases of diabetes is a real source of danger. Hitherto the most brilliant results obtained with insulin have been in the treatment of diabetic acidosis and coma; in such cases it must be given immediately. The article in our contemporary describes the care that was taken by the University of Toronto to ensure the proper manufacture of insulin, and to provide for the control of its distribution among the medical profession. In order to obtain insulin on a large scale in America an arrangement for its manufacture was made first of all with the firm of Eli Lilly of Indianapolis, who also distributed the drug to a large number of physicians for clinical trial. When, however, a satisfactory process had been worked out for the preparation of insulin on a large scale it was decided to grant licences to manufacture the drug to other firms who were able and willing to comply with certain conditions imposed by the Insulin Committee. That the policy of the Committee was justified is shown by the statement that several firms in America have exploited for the treatment of diabetes entirely worthless preparations, to which they gave names so closely similar to insulin as to convey the impression that these contained the antidiabetic hormone. But for the conditions imposed the market would probably by now have been flooded with preparations of unknown potency and durability, and serious accidents would certainly have resulted. At the end of the article a full bibliography is given of the literature dealing with insulin published up to the present time.

INTERNATIONAL CONFERENCE OF RED CROSS SOCIETIES.

THE eleventh International Conference of Red Cross Societies, organized by the International Red Cross Committee of Geneva, will be held at Geneva on August 28th and following days. The first of these conferences took place in 1863 as the outcome of Henri Dunant's *Souvenir de Solferino*, and led to the diplomatic conference which framed the Geneva Convention of 1864 to ameliorate the sufferings of sick and wounded in war. Periodical conferences subsequently fell into abeyance for fifteen years during and after the Franco-German war of 1870-71; they were revived in 1884 and were held every five years in the capitals of European countries until 1912, when the ninth conference was held in Washington. The great war then intervened and the next conference was not held until April, 1921. By that time the League of Red Cross Societies, as an offshoot of the League of Nations and the treaty of Versailles, had established itself in Geneva and seemed to overshadow the old International Committee. But the spheres of work of the two organizations were adjusted by mutual agreement during the conference of 1921: the League confining its activities to international health propagandism, child welfare, and disease prevention in time of peace, and the International Committee to maintaining solidarity amongst the National Red Cross Committees for work during war. It is this latter aspect of Red Cross activity with which the International Conference of Red Cross Societies, which now meets every two years, is chiefly concerned. One of the principal matters before the eleventh conference is the history of efforts which have been continued during the present year to bring about a fusion of the League of Red Cross Societies and the Geneva International Committee. These efforts have—according to a statement published in the *New York Herald*—so far failed. In this connexion it may be recalled that the voluntary aid organizations of Great Britain took no part in the International Conferences of Red Cross Societies until 1907, although a War Office or Government delegate was appointed to attend each. When, after the South African war, the National Society for Aid to Sick and Wounded in War was reconstituted as the British Red Cross Society, it began to take an active part in the conferences. We understand that the British Red Cross Society will be represented next week by Sir Edward Stewart, and the War Office by Sir W. G. Macpherson; each attended the last conference in a similar capacity. It is expected that the Red Cross Societies of the Dominions also will be represented again.

CONTROL OF VENEREAL DISEASE.

WE understand that the National Council for Combating Venereal Diseases and the Society for the Prevention of Venereal Disease, each of which has considered and unanimously accepted the Trevethin Report, have decided to confer together in order to determine what joint action can be taken for giving effect to the recommendations contained in the report. This conference will probably be held after the summer vacation. A full account of the findings of Lord Trevethin's Committee and its recommendations was published in the BRITISH MEDICAL JOURNAL of June 9th, 1923 (p. 976). In discussing the report on June 16th we expressed the view that it provided a starting point for work towards the common goal of reducing the incidence of venereal disease to negligible proportions, and that it ought to be the means of ending unfortunate controversies which have so prejudicially affected the campaign against this disease in the near past. The medical profession at large will welcome the prospect of the two societies working together. The public has a right to expect guidance and assistance from a united profession; we hope, therefore, that the forthcoming conference will be the prelude to active co-operation.

"BROWN HEART."

"BROWN HEART" is not another calamity that has to be added to the list of the many ills that afflict humanity. It is the name given to a functional disease of apples and pears, as the result of researches carried out during the past four or five years by Drs. Franklin Kidd and Cyril West on behalf of the Department of Scientific and Industrial Research of the Food Investigation Board. An account of their work has just been published,[1] and is of great interest from the physiological, pathological, and economic standpoints. The condition was first observed in 1918 in the course of experiments conducted with the object of investigating the retarding effect of carbon monoxide and subnormal oxygen upon the ripening of apples as a cheap method for preserving the home-grown apple crop in storage. It was then observed and since confirmed that "brown heart" appeared in apples stored in the presence of carbon monoxide above a certain concentration, combined with a subnormal oxygen concentra-

[1] Special Report No. 12. Obtainable from H.M. Stationery Office Publishing Department, Imperial House, Kingsway, and from the chief publishers in New Zealand, Johannesburg, Calcutta, Bombay, and Madras, at 4s. 7½d. post free.

tion; and recently in shipments of apples from Australia thus affected the condition was traced to an excess of carbon monoxide accompanied by a low oxygen concentration in the holds. In an illuminating prefatory note to the special report Mr. W. B. Hardy, F.R.S., the director of the Food Investigation Board, draws attention to the physiological or functional as distinct from the infective nature of this abnormal condition. In other words, it is not a condition that is due to moulds or infective organisms. The apple, as a living organism, breathes, and "brown heart" is the result of physiological suffocation. The researches of Kidd and West entailed a study of its respiration and analysis of its internal atmosphere—that is to say, of the air enclosed in certain microscopic canals which traverse the flesh of the fruit. The disease was thus found to be caused by the death and subsequent browning of the internal fleshy tissue when the amount of carbon dioxide in this internal atmosphere was excessive. The external tissue remains undamaged and the fruit appears generally sound until it is cut open, when the fleshy tissue around the heart of the apple is seen to be brown-coloured and rotten. The condition may be caused by a brief exposure to excessive carbon monoxide concentration, and this rather than a prolonged average concentration is the most important factor, although temperature also influences the results. The practical effect of the investigations is that, while the ripening of the fruit can be retarded by a certain concentration of carbon monoxide, and a subnormal oxygen concentration above a certain minimum, without injury, a degree of ventilation is necessary to prevent the carbon monoxide becoming excessive and so suffocating the respiration. These researches also throw light on what is known as "bitter pit" in orchards, a condition in which small, isolated patches of dead tissue appear immediately below the skin of the fruit, causing the skin to sink in after the patches dry out. The whole series of experiments and conclusions are of great interest and of many-sided scientific and economic value. They are an excellent example of the useful work that has been, and is still being, carried out by the Food Investigation Board, which was instituted during the war. It is undersood that further researches will be carried out to determine the immediate possibility of an improvement in the method of storage during overseas transit not only of apples but also of other fruits. A report, which will have a definite bearing on this, is being prepared, embodying the results of gas-storage tests with various fruits. The special research was carried out under the direction of Dr. F. F. Blackham, F.R.S.

THE INTRODUCTION OF HYPODERMIC MEDICATION.

In the account of Charles Gabriel Pravaz, under the heading "Nova et Vetera" in the Journal of August 18th, our contributor made a passing reference to Alexander Wood (1817-84), at one time President of the Royal College of Physicians of Edinburgh (1858-61). Wood was the first representative of the College (1858-73) on the General Medical Council, on which he did yeoman's service for his fellow countrymen by successfully advocating the abolition of territorial and limited licences to practices, thus removing the difficulties previously besetting those migrating from the North to the South of England. His name should also be gratefully remembered as the originator of hypodermic medication; in 1853, taking as his model the sting of a bee, he constructed a small glass syringe with a fine perforated needle point attached, and thus injected morphine hypodermically. Two years later (1855) he published *A New Method of Treating Neuralgia by Subcutaneous Injection*. Curious as it may now seem, the injection was at first, and apparently as a matter of course, made by Wood's direction into the painful area. Hypodermic injection at a distance from the pain was first carried out by Mr. Charles Hunter, house-surgeon at St. George's Hospital, in 1858, who as late as 1866 felt it necessary to argue, through twelve pages in the first volume of *St. George's Hospital Reports*, that hypodermic injections of morphine at a distance from the painful spot were really effective—or, in his own words which then probably appeared bold and now seem unduly cautious, "Notwithstanding the strong current of opinion still in favour of localization . . . distant injections have with some experimenters, as a rule, been always equally effectual with local injections." Very shortly after this Sir Clifford Allbutt recorded in the *Practitioner* (1869) the remarkably good effects of hypodermic injections of morphine in patients suffering from severe heart disease; this at the time was also rather a bold, though most valuable, departure from paths of strict orthodoxy. Truly "our little systems have their day . . . and cease to be."

THE BRITISH ASSOCIATION, LIVERPOOL, 1923.

As already announced, the ninety-first annual meeting of the British Association for the Advancement of Science will be held at Liverpool from September 12th to September 19th. On the opening day there will be meetings of the Council and the Organizing Sectional Committees; at 5 p.m. the General Committee will meet, and at the inaugural general meeting at 8.30 p.m. Sir Ernest Rutherford will deliver his presidential address, on the electrical structure of matter. On Thursday, September 13th, Professor G. H. Nuttall, F.R.S., as President of the Section of Physiology, will give an address on symbiosis in animals and plants. On September 14th at a joint meeting of the Sections of Chemistry and Physiology, a discussion will take place on the physical chemistry of membranes in relation to physiological science; at 8.30 p.m. on the same day Professor G. Elliot Smith, F.R.S., will deliver a lecture on the study of man before a general meeting of the Association. Saturday, September 15th, will be devoted to excursions. A discussion on the delinquent child will be held on Monday, September 17th, at the joint meeting of the Sections of Psychology and Education. Professor J. J. R. Macleod will open on the same day a discussion in the Section of Physiology on insulin and its value in medicine, and Dr. Edridge-Green will read a paper in the same section on the effect of the blood in the retina on colour equation. A scientific soirée will be held on the evening of September 16th, when exhibits will be shown illustrating the results of recent work in various departments of science. Throughout the course of the week an exhibition of scientific apparatus will be on view in the Central Technical School, and the Air Ministry is arranging a meteorological demonstration. Most of the thirteen sections will hold their sessions in the buildings of the University of Liverpool. The reception room and administrative offices will be held in St. George's Hall. In connexion with the meeting a series of public lectures for citizens and children will be given by members of the Association.

HETEROMORPHOSIS.

It is not uncommonly thought that morbid histology is practically worked out, and no doubt it has been thrust into the shade by the attractions of other branches of pathology, and especially, perhaps, by the study of metabolism, biochemistry, and disorders of function. But that morbid histology affords plenty of scope to research workers is shown by Dr. G. W. Nicholson's papers in

Guy's Hospital Reports and elsewhere. In a recent paper with the rather formidable title "Heteromorphosis (metaplasia) of the alimentary tract,"[1] he contends that the only way to understand gross malformations, such as monsters, originating during embryonic life is the investigation of the very simplest anomalies due to pathological states, or the heteromorphoses. The distinction generally drawn between congenital anomalies and those acquired later is to his mind purely artificial, since every malformation must originally have been acquired. Underlying the article is distrust of Cohnheim's theory of tumours as due to foetal displacement of cells, as is shown by the dictum that "displaced and undifferentiated cells seldom, if ever, exist except in the imagination." Specimens of vitelline duct, Meckel's diverticulum, pancreatic cyst, inflamed gall bladders, and tuberculous ulcer of the colon, all showing gastric mucous membrane, are described to support the argument that inflammation produces the changes in the epithelium and that there has not been a displacement of gastric "rests" into these various situations. Chronic inflammation first causes active proliferation of the epithelial cells and de-differentiation or a regressive change, but this may in abnormal circumstances be succeeded by differentiation, or more correctly a re-differentiation, since there was a preceding de-differentiation of the epithelium, which has retained its prospective potency to undergo differentiation into gastric mucous membrane. The changes described in cholecystitis are specially interesting; out of 35 inflamed gall bladders 24 contained mucous glands, which are normally present only in its neck, and 17 of these showed gastric glands as well; it is argued that the gall bladder has throughout life the potentiality of forming gastric glands; normally this capacity remains latent, but it is readily roused to activity as a result of the proliferation involved in cholecystitis. The study of de-differentiation and re-differentiation as the result of inflammation has a most important bearing on tumour formation, and it is to be hoped that Dr. Nicholson will continue his efforts to throw light on this difficult problem.

[1] G. W. Nicholson, *Journ. of Path. and Bacteriol.*, Edinburgh, 1923, xxvi, 396-417.

THE EDUCATIONAL NUMBER, 1923.

Our next issue, dated September 1st, will be the annual Educational Number of the British Medical Journal. The usual features will be supplemented by two introductory articles on certain aspects of the training of the medical student, contributed at our request by Sir George Newman and Dr. J. S. Fairbairn. The former writes on the permeation of the medical curriculum by preventive medicine, and the latter on the teaching of obstetrics and gynaecology; in their insistence on the need for preventive teaching, these articles are complementary to each other. The concise information annually provided for intending students of medicine and newly qualified practitioners has been revised throughout with the co-operation of the deans and secretaries of the various medical schools and kindred institutions. A full account is given of the important changes that have been introduced this year into the scheme of study and examination in accordance with the resolutions and recommendations of the General Medical Council. Among the sections which have been rewritten or largely recast may be mentioned those on post-graduate study in London, and on the present and future of psychological medicine; also the introductory note on professional study and practice, addressed mainly to prospective students and their parents. The Educational Number for 1923 will include also articles on the various public services, on the medical education of women, on tropical medicine, on dental study and practice, and on the numbers of the medical profession. The requirements of the universities and other licensing bodies, and the opportunities offered by the medical schools and teaching institutions of the British Isles, are summarized upon the plan followed in recent years. The "preventive idea," dwelt on by Sir George Newman in his opening address, will be found reflected in various parts of the issue, more particularly in the articles on the revised curriculum and on the public health service.

PRIMITIVE SURGICAL INSTRUMENTS.

The Museum of the Royal College of Surgeons of England, in Lincoln's Inn Fields, has recently been enriched by the addition of a series of very primitive surgical instruments used at the present day by the Shawiya, a Berber tribe living in a remote part of Algeria. The donor is Captain M. W. Hilton-Simpson, B.Sc., author of *Arab Medicine and Surgery*, a work which describes these uncouth contrivances, with illustrations; it was reviewed in our issue of February 17th, 1923 (p. 291). Though very roughly fashioned, the instruments appear to be strong and serviceable, and include the primitive bone-saw known to Ambroise Paré and modified by Hey as the saw which bears his name. This collection forms an instructive contrast to a set of ophthalmic instruments used in the island of Crete, probably during the Venetian occupation, and remarkable for their artistic finish. They were collected in Crete, seventy years ago, by Admiral Spratt, C.B., F.R.S., and recently presented by Colonel Spratt-Bowring, C.B.

VOLUNTARY BOARDERS IN MENTAL HOSPITALS.

In his report for 1922 Dr. A. A. D. Townsend, medical superintendent of the Barnwood House Hospital for the Insane, near Gloucester, makes several references to voluntary boarders. As many as nine patients, after decertification upon recovery, elected to remain as voluntary patients for the whole or some part of the year, preferring a further residence in the hospital before returning to home life. In regard to the position of voluntary boarders generally, Dr. Townsend expresses the hope that greater latitude will be granted to medical officers. Existing regulations should, he suggests, be so modified that certification of a boarder only becomes necessary in very exceptional circumstances. In support of this view he quotes the case of a voluntary patient suffering from depression and apprehensions, whose mental symptoms suddenly became so acute that, as the law now stands, certification or discharge was necessary. Being unfit for discharge she was thereupon certified, much to the distress of her husband and relations. Within a fortnight of certification she had completely recovered. Experience of other cases persuades Dr. Townsend that some change in the regulations regarding voluntary patients is called for. In this connexion we recall that the Board of Control in its last annual report recommended that a voluntary boarder in a registered mental hospital or licensed house should never be placed under certificate while in residence unless such a course is absolutely necessary for the safety of the patient or the protection of the public.

LONDON POST-GRADUATE COURSES.

Special courses in general medicine and surgery, cardiology, dermatology, diseases of children, ophthalmology, proctology, and other subjects have been arranged up to June, 1924, by the Fellowship of Medicine and Post-Graduate Medical Association. The programme for next month will include a two weeks' course in general medicine and surgery, from September 10th to 22nd, at the Hampstead General Hospital in conjunction with the Hospital for Epilepsy and Paralysis, Maida Vale, the North-Western Fever Hospital, and Paddington Green Children's

Hospital. There will also be a special course of instruction in infants' diseases at the Infants' Hospital, from September 3rd to 21st, a course in ophthalmology at the Central London Ophthalmic Hospital, from September 3rd to 29th, and a course in dermatology at St. John's Hospital for Diseases of the Skin, from September 17th to October 13th. Particulars of the courses may be obtained from the Secretary, Fellowship of Medicine, 1, Wimpole Street, W.1.

WE announce in our Service notes this week the promotion of Surgeon Captain Arthur Reginald Bankart, C.V.O., R.N., now serving in H.M. Yacht *Victoria and Albert*, to Knight Commandership of the Royal Victorian Order. It was largely owing to Sir Reginald Bankart's personal influence that members of the British Medical Association attending the Annual Meeting at Portsmouth last month were able to visit the Royal Yacht.

VARIETIES OF SMALL-POX.

BY

JOHN C. McVAIL, M.D., LL.D., F.R.F.P.S.

THE extensive prevalence of mild small-pox in England last year and this year has naturally created much medical interest in the subject, and the purpose of this article is to review briefly the general position.

The subject is far from new. As pointed out by me in the Milroy lectures in 1919, Sydenham referred to small-pox without eruption. Wagstaffe, in the eighteenth century, said of small-pox that "there is one sort in which a nurse cannot kill, and another which even a physician can never cure." Jenner, in 1789, seven years before his first vaccination, discussed the question whether a mild type of small-pox then existing might not be used for protective inoculation in preference to matter from the ordinary disease. Adams, of the London Small-pox Hospital, wrote on "pearl-pox" in 1806. About a century ago Professor Thomson of Edinburgh defended at much length the proposition that small-pox and chicken-pox are one disease, and, if I mistake not, Hebra was of the same opinion. In the eighteenth century names such as stone-pox, horn-pox, water-pox, swine-pox were not uncommon, but probably referred mainly to modified second attacks of small-pox, which occasionally occurred at long intervals after a first attack, particularly, no doubt, if the first attack had been mild.

In recent years mild or modified small-pox has been much heard of in various parts of the world—in Trinidad, the United States, Canada, Australia, and South Africa. Some outbreaks have been the subject of careful and valuable investigation, as recorded in the *Proceedings of the Royal Society of Medicine* and in the *Transactions of the Society of Tropical Medicine and Hygiene*. Various names have been applied to such outbreaks in the countries where they have occurred—alastrim, Cuban itch, or, in South Africa, amaas, meaning milk-pox. In one instance such a cognomen was adopted to allay alarm in the country surrounding the invaded area, lest the alarm should prevent the bringing in of necessary supplies. But such nomenclature leads to confusion, and whatever is variolous should be so acknowledged, whether mild or severe.

In this country a most puzzling and anomalous outbreak in Suffolk and Norfolk was investigated in 1919 by Dr. Monckton Copeman, whose report, published by the Ministry of Health in its 1919-20 volume, is of much interest. In a total of 31 cases only four were seriously ill, and the only death was that of a puny unvaccinated baby. The infection, it was supposed, might have had its origin in Egypt, and in the course of his early visits Dr. Copeman expressed the opinion that "as the disease gradually became more acclimatized" it would tend to "approach more nearly to the type of small-pox as ordinarily met with in this country." That, as it turned out, was the course of events; in the later cases the severity of the symptoms was markedly greater, and backache, for example, was added to the initial headache.

In that connexion a very important question is whether the exceedingly mild variola at present prevalent in Gloucester and elsewhere will continue to breed true—will be mild throughout the whole of its prevalence, or will, whether by degrees or suddenly, change its character and take on the classical appearances of small-pox so well known throughout the world. No certain answer can be given to the question. That close and competent observer, the late Dr. Franklin Parsons, related how "in one town in Lancashire there were outbreaks from two sources concurrently; one could be traced to the cases imported from America, of a mild type, while another was traceable to the infection which had come across from Paris via London, and that was severe." Indeed, the fatality rate from mild small-pox in this country is now even lower than in the prevalence of 1902-5, when the American type first became prominent on these shores. At that time fatality rates ran from about 1 per cent. to 4 or 5 or 6 per cent., including vaccinated and unvaccinated, but no large outbreak that I know of had so low a rate, say, as last half-year's two or three deaths in over 1,200 cases. In America we in this country have generally understood that mildness of type had become established so that the disease was in some places being regarded as endemic, and not worth troubling about. Now, however, the picture has suddenly changed. The United States Treasury Department, in its Public Health Report for the week ending June 22nd, 1923, has a note entitled "Increasing virulence of small-pox in the United States," and accompanies it by an important table of statistics, headed "Small-pox cases and deaths, and deaths per 100 cases, in 275 American and Canadian cities, 1920, 1921, and 1922." The population of the cities is not stated, but there is full information as to the number of cases and of deaths in each year for the total cities, and for ten or eleven "special cities." Canadian cities to the number of 29 are included in the 275, because the data are contained in a statistical bulletin of the Metropolitan Life Insurance Company. Taking the cities as a whole, there were 30,328 cases in 1920, 23,977 in 1921, and 8,709 in 1922. The numbers, therefore, have decreased. But the fatality rate was 0.6 per cent. in 1920, 1.1 in 1921, and 5.5 in 1922. In the special cities jointly, the fatality rate in 1920 was 0.2 per cent., in 1921 8.5 per cent., and in 1922 no less than 28.4 per cent. Of individual cities, Kansas and Denver were very hardly hit, the deaths being at the rates of 45 and 31 per cent. It is surmised that the outbreaks in these two towns may have had the same unknown origin, but whatever the sources it is clear that either the mild type has changed or a severe type has taken its place in these and other cities.

In no country can there be any certainty as to the future of small-pox, and the only prudent course is to be prepared against whatever may come. Vaccination, renewed as required, can prevent both severe and mild small-pox. The one form protects against the other, vaccination protects against both, and Chapin, when the mild form was spreading in America, pointed out, further, "that persons who have had the mild type are equally immune to vaccination." As to diagnosis, I would call attention to Dr. Wanklyn's article in the BRITISH MEDICAL JOURNAL of July 21st (p. 106), and would also remind the profession that the Ministry of Health has appointed for each part of the country a consultant skilled in all that relates to variola. When doubt arises there should be no delay in calling in this aid.

England and Wales.

METROPOLITAN ASYLUMS BOARD.

Report for 1922-23.

THE report of the Metropolitan Asylums Board for the year ending May 31st, 1923,[1] has just been issued. It is larger by nearly 80 pages than the report for the previous year. After the death in December, 1921, of Sir German Sims Woodhead, who had acted as bacteriological adviser to the Board for seventeen years, the arrangements to be made for continuing his work were reviewed in consultation with the Ministry of Health and the Medical Research Council. As a result of this it was decided to put the necessary scientific advisory work into commission by inviting the help of several scientists, each expert in his own way, working together as an advisory committee. The committee has now been constituted. Its Chairman is Dr. Foord Caiger, chief medical officer in the Board's infectious hospitals service. The other members are Sir G. S. Buchanan, representative of the Ministry of Health, Professor H. R. Dean (bacteriology), Dr. C. M. Wenyon (protozoology), Professor J. C. G. Ledingham (immunology), Professor Hugh MacLean (biochemistry), and Dr. Major Greenwood (statistics).

The year 1922 was the third from the commencement of the recent high prevalence of infectious disease in the metropolis, which, though it reached its culminating point in 1921, actually started in 1920. The incidence of scarlet fever and diphtheria in 1922 should, according to anticipation, have been very high, though substantially lower than in 1921. But this expectation was, happily, not realized; on the contrary, the total incidence of scarlet fever and diphtheria in the London area fell with great rapidity towards the normal, and this pronounced fall continued during the early months of 1923. A remarkable feature of the recent group of epidemic years was the large proportion of diphtheria cases. The number of doses of diphtheria antitoxin supplied to the Board's institutions was nearly 120,000 last year; each dose contained 3,000 units. Reference is made to the difficult problem of dealing with cases of cross-infections of high infectivity, of doubtful diagnosis, and of exposure to infection. Recent experience during the time when scarlet fever, diphtheria, and measles were all prevalent together in London, has shown that in the acute hospitals about 25 per cent. of the total accommodation should be available for isolation purposes. To meet this need the Board has taken steps to provide additional observation accommodation; the method adopted at the Western Hospital is described in the report. During 1922, 72 cases of small-pox were admitted; 39 were discharged, and 23 died; 11 were still under treatment on the last day of the year, and one patient had been carried over from the previous year. Most of the cases occurred in the institution of the Poplar Board of Guardians, where, it will be remembered, an outbreak of small-pox became widespread before it was recognized.

Some idea of the magnitude of the Board's operations and its sphere of responsibility may be gained from the following figures. The district it serves covers 121 square miles, and the population numbers 4½ millions. The Board maintains fourteen infectious diseases hospitals, two institutions for venereal disease and nine for tuberculosis, five mental hospitals, a training colony for improvable imbeciles, and another for sane epileptics, five children's institutions, and a training ship. It maintains also a river ambulance service, with three wharves and five steamboats, and a land ambulance service with seven stations and 150 vehicles, a laboratory and a research establishment, a central store department, and a number of casual wards. During the year under review more than 200,000 passengers were conveyed by the land transport service, and more than 5,500 by the river ambulances.

[1] Metropolitan Asylums Board: Annual Report for the year 1922-23. Published from the office of the Board, Victoria Embankment, E.C.4. (Pp. 254. Price 5s.)

NEWCASTLE ROYAL VICTORIA INFIRMARY.

According to the annual report of the Royal Victoria Infirmary, Newcastle-upon-Tyne, the year 1922 showed a steady growth in the work of the hospital, the number of in-patients treated having exceeded all previous figures. The daily average number of beds occupied was 525.4, which represented 98.3 per cent. of the total beds available. During the year 11,876 in-patients were treated, and 93,406 new cases were treated in the out-patients' department during the year, the total number of out-patient attendances amounting to 276,079. As compared with three years ago the number of in-patients rose 10 per cent., the out-patients and casualty cases 11 per cent., and operations 19 per cent. As many as 15,669 accident cases were treated, and of this number 1,343 were detained for admission to the wards. The total number of surgical operations performed during the year was 7,881 upon in-patients, and 3,874 upon out-patients. The financial result of the year's working was satisfactory: during 1922, £98,602 was received, £75,116 being in subscriptions and donations; the expenditure for the year amounted to £97,057, so that there was a balance of £1,545 on the right side. The cost per occupied bed on ordinary expenditure for 1922 amounted to £174 2s., as against £202 5s. for the previous year. During the year Colonel Innes Hopkins presented to the Infirmary the house and grounds situated at Ryton, known as "The Innes Hopkins Memorial Home," which for the past two years had been in the occupation of the Ministry of Pensions for disabled soldiers. It is intended to use the house as a convalescent home, thus enabling some of the cases in the wards to be at once removed to a healthier environment and thereby affording some relief to the overcrowded beds of the hospital. The intention is that this home should be self-supporting, and with this object in view it is proposed to ask patients recommended for treatment to contribute towards their maintenance. In the medical report of the Infirmary it is noted that diseases of the digestive and nervous systems remained the most frequent medical disabilities for which patients sought admission, while the diseases resulting in the greatest number of deaths were pneumonia and organic heart disease. In the surgical report it is stated that the operations for perforated ulcer of the stomach and duodenum showed an increase from 91 in the previous year to 112, but owing to patients being sent in sooner after the onset of an attack the mortality was reduced from 35 to 22.3 per cent. The number of open operations for tuberculous disease of joints continued to diminish; 24 operations were performed for this condition, which contrasts with 61 in 1892. The skin department reports a progressive reduction in the total number of new cases of venereal disease. In the ophthalmic department 274 operations were performed, being an increase of 62 over the previous year. A striking feature of the work of the throat, nose, and ear department was the number of foreign bodies removed from the oesophagus by means of the oesophagoscope and *x*-ray screen method, the foreign bodies mostly consisting of false teeth and coins. In the electrical department more work was done in 1922 than ever before, and the space at its disposal was often uncomfortably crowded. The pathological report indicates a considerable increase in every part of the work undertaken by the department; the number of necropsies was 465, and the number of clinical reports from the wards, etc., was 1,183. In the bacteriological department 3,371 specimens were received and reported upon during the year.

NOTTINGHAM GENERAL HOSPITAL.

A new Nurses' Home at Nottingham General Hospital was opened by the Prince of Wales on August 1st. The new home is a four-story building of imposing design and accommodation is provided for 130 nurses, each of whom will have a bedroom of her own. The cost of the home will exceed £60,000, but the money has already been raised, and the opening of the nurses' home is but the first portion of the hospital's large extension scheme. The further extensions contemplated include new wards and new departments for out-patients, *x* rays, pathology, and bacteriology. The Prince of Wales was received at the main entrance

hall of the General Hospital by Lieut.-Colonel F. E. Seely, President of the hospital, and other officials, and inspected one of the surgical wards, which during the war was used for the treatment of military patients, exchanging a few words with the patients who were being treated there. He then proceeded from the hospital to the Nurses' Home, upon which is an inscription commemorating the great war, and opened the door with a golden key. The new home was designed by Mr. Robert Evans, in collaboration with Dr. D. J. Mackintosh of Glasgow Royal Infirmary.

Scotland.

Central Midwives Board for Scotland.

The examination of the Board, held simultaneously in Edinburgh, Glasgow, Dundee, and Aberdeen, has just concluded with the following results: Out of 135 candidates who appeared for the examination 120 passed. Of the successful candidates 29 were trained at the Royal Maternity Hospital, Edinburgh; 42 at the Royal Maternity Hospital, Glasgow; 4 at the Maternity Hospital, Aberdeen; 7 at the Maternity Hospital, Dundee; 6 at the Queen Victoria Jubilee Institute, Edinburgh; 12 at the Cottage Nurses' Training Home, Govan, Glasgow; and the remainder at various recognized institutions.

Loans in Aid of Edinburgh Building.

Edinburgh Corporation has had under consideration a number of applications from persons who desire to take advantage of the recent powers conferred on local authorities to grant loans in aid of building houses. This is the first list of applications, comprising 72 houses. One-half are applications by employers erecting houses on behalf of miners; one-third are for houses of the better-class kind for the occupation of working-class proprietors; and the remainder are for individual houses intended for occupation by the applicants. With regard to the amount that would be advanced, the Housing Director suggests that on a building estimated at £550 with a probable rental of £32, the amount of advance with subsidy might be from £460 to £500.

Scottish Mental Hospitals' Accommodation.

In a report to the Aberdeen District Board of Control, Dr. H. C. Marr, Commissioner of the General Board of Control, expresses the hope that it will not be found necessary to extend the accommodation of Kingseat Mental Hospital, as the present institution is large enough to obtain a maximum of efficiency and there are at present many vacant beds in other institutions throughout Scotland. Also relief may be expected in the near future by extended amplification of the Mental Deficiency and Lunacy (Scotland) Act of 1913, which owing to the war and subsequent financial restrictions had its operations greatly limited. It is expected that mental defectives will be dealt with under the Act elsewhere than in a mental hospital. The hospital, with its elaborate medical equipment and facilities, and its essentially curative aims, is unsuited for the custodial care and occupational education which are necessary for mental defectives.

Faith Healing in Scotland.

An important sign of the times in regard to the spread of the practice of faith healing by mass suggestion was witnessed in a religious festival held on August 15th at the grotto of Our Lady of Lourdes in Carfin, to celebrate the feast of the Assumption. Large crowds flocked to Carfin from all parts of the West of Scotland, the number of persons present being estimated at close on 50,000. In the forenoon a visit was paid to the grotto by 300 Italian pilgrims drawn from all parts of Scotland. Headed by a banner with the device, "Ave Maria," the procession of men, women, and children marched through the village singing hymns. On arrival at the grotto, flowers were presented by children among the processionists to the priest in attendance, who placed them on the shrine. In the afternoon there was a similar procession of cripples composed of inmates of Roman Catholic institutions in Edinburgh and the East of Scotland. On their arrival at the grotto, special prayer and invocation was offered for the sick and afflicted, and the vast crowd repeated the words of the prayer, "Lord, say but the word, and I shall be whole." Whether any physical benefit accrued to any of the cripples is not known.

Ireland.

County Galway Board of Health.

The County Galway Board of Health has published its first annual report. In a foreword Mr. W. T. Cosgrave—who, when Minister of Local Government, was mainly responsible for the amalgamation of unions in Ireland—states that he has great hopes that in the County Galway and throughout the Free State the new schemes established for the relief of the poor and the treatment of the sick will be administered prudently and humanely. The report states that the medical and surgical staff of the County Hospital consists of a visiting physician, a house-physician, and a house-surgeon; and an honorary staff appointed by University College, Galway, consisting of two surgeons, a gynaecologist, obstetrician, ophthalmologist, and otologist. In February, 1922, the Galway Health Board suggested the grading of dispensary districts with graded salaries and a promotion system. The Local Government Department pointed out that it would be inadvisable to proceed with this scheme until the whole scheme of Irish Medical Services is remodelled. To meet, however, the grievances of the dispensary doctors the Health Board agreed, as a temporary measure, to pay each of its dispensary doctors a minimal salary of £300 per annum. The Local Government Department refused to sanction the proposal except in the case of doctors with ten years' completed service. Newly appointed doctors must commence on an initial salary of £250 per annum with annual increments of £5 until a maximum of £300 per annum is reached. The report states also that during the year under review there were performed 2,771 vaccinations, and that there were treated in the dispensaries and in the people's homes 9,807 cases. There were 1,927 cases admitted to the different hospitals in the county; of these 121 were fever cases.

Labour and Medical Benefits.

At a meeting of the Irish Labour and Trade Union Congress held recently, a resolution was unanimously adopted demanding that medical benefits be included in the present State scheme of National Health Insurance, and urging on the National Executive to convene a conference of Trade Union Approved Societies to assist in the preparation of a suitable scheme to give effect to this resolution.

Correspondence.

MEDICAL CHARITIES.

SIR,—I am sorry my absence from London has prevented me from answering at once the courteous letter of Sir Charters Symonds in which he refers to the statements I made at Portsmouth about the Royal Medical Benevolent Fund. It was because I am a member of the Committee of Management that I was able to speak as I did, and other members know that I simply repeated what I have said in our committee meetings—that new ideas were required in the organization.

I have the greatest admiration for the time given, trouble taken, and work accomplished by Dr. Newton Pitt, but I am sure he could be relieved of a considerable amount of detail work in his secretarial duties if we had a wider business method of administration.

Frankly, after reading Sir Charters Symonds's letter I fail to see any great advancement of the fund in the last twenty years. The figures he quotes for comparison, from 1902 to 1922, are not encouraging. In 1902 income and subscriptions came to £3,946, in 1922 £8,080—the figures have doubled. But alas, the economic conditions have changed and eight thousand pounds now is nothing like double the value of four thousand pounds of twenty years ago.

I knew that during the last two years special appeals

had been made in certain towns by prepaid stamped envelopes addressed to non-subscribers through the local secretaries; but I did not know that by this and the special general meeting at the College of Physicians only £400 had been obtained in new subscriptions this year; if this represents four hundred new subscribers, which I very much doubt, it only adds another one per cent. to the 10 per cent. of the profession now subscribing.

We are told that in 1913, at a festival dinner, £3,197 was raised—a splendid result; yet when I put forward the advantage of another dinner and proposed further that we should have an annual dinner, I received little support and none from the officials.

The conference called by the British Medical Association failed because both the present committees of the two medical charities wished to continue their own independent action and many members were afraid of any close connexion with the Association. I believe there is a strong feeling in the profession that there should be only one charitable institution. We are anxious to take away definitely from Epsom College that charitable aspect which we are told has been proved to be harmful to the college; and we maintain that while Epsom College grants annuities this stigma of charity will remain.

I said at Portsmouth that the administration of the Royal Medical Benevolent Fund is of the same character as it was twenty years ago. This is a fact, and the committee have always been proud of their small working expenses. We must, however, adapt ourselves to new circumstances. Now, if money is required, whether for charity or any other object, money must be expended—as our hospitals are experiencing in collecting their subscriptions. Further, to make our fund correspond to the needs of the profession, we cannot trespass upon the necessary time required from any honorary secretary, except in an advisory capacity, and the ordinary routine duties of the secretaryship should be undertaken by a permanent responsible official.

I take the liberty to suggest the following four points which should be discussed with regard to the future reorganization of the Royal Medical Benevolent Fund:

(1) A permanent office is needed for the fund. It is not enough to share a room in the Medical Society building; we require our own office, which should be distinguished by its character and name.

(2) We need also a permanent secretary, who would devote his whole time—an organizer, acting under the guidance of the honorary officers and committee, and assisted by an adequate clerical staff.

(3) A complete reorganization of our honorary secretaries' list is needed. Personally I would hand over the collection of local subscriptions to the Divisions of the British Medical Association, for I am sure if the committee would co-operate in a more active manner with the Association greater support would be given and more money would be obtained. I do not share with Sir Charters Symonds his fear of the 20,000 non-members, and I would remind him they are a diminishing quantity, for the membership of the Association is annually increasing.

(4) An annual dinner is, I think, very important. It should be carried out on similar lines to the Artists' Benevolent Fund dinner: well advertised and canvassed amongst the profession. A prominent public man should be asked to preside—the Prince of Wales as the first Chairman would be a splendid augury. He should be supported by a number of well chosen stewards, who would present to the treasurer their separate totals collected for him to read out at the dinner; this would stimulate competition to obtain the highest amount.

I am sure that if some alterations were made in the organization along the lines of the above suggestions our Benevolent Fund would become better known and more largely supported. These reasons alone guided me in my criticisms at the Portsmouth meeting.—I am, etc.,

Lausanne, Aug. 18th. G. E. HASLIP.

P.S.—The excellent new progressive idea of the Leicester Panel Committee, of subscribing a farthing for each State-insured patient, came either from Dr. Astley Clarke or from his committee, and not from any request of the Royal Medical Benevolent Fund. I even question whether the Committee of Management have thought of asking other Panel Committees to follow this fine example.

SIR,—I have read with much interest all that has appeared recently in the JOURNAL concerning the Royal Medical Benevolent Fund.

I am quite certain that in this, as in all other charities, fresh subscribers are only obtained by interest being aroused through the personal efforts of those who already subscribe. I would go so far as to say that all the prominence that has been given by the JOURNAL to the meagre support afforded by the profession generally will have little or no beneficial effect in securing an appreciable number of new supporters. The vast majority of readers will merely glance at the speeches and letters, and, while perhaps agreeing that such a fund deserves to be well supported, will think no more of the matter.

Two or three years ago I was appointed at my own request local honorary secretary for the Fund in the town in which I have practised for many years. I wrote to, or interviewed, every medical man and woman in the district, and with little or no trouble I obtained a subscription from every one without a single exception, thus being able to collect about £30. So far, I am pleased to say, the subscriptions have been repeated annually, and I have no reason to believe that anyone intends to drop out. I take no praise to myself over this, for I am only doing my duty in a small way in trying to help those members of our profession and their dependants who have fallen on evil days. But what I want to emphasize is that what I have done plenty of others can do. I note that throughout England and Scotland there are only between 50 and 60 towns where organized collections take place under a local honorary secretary. It should not be difficult to get some members of the profession to act in this capacity in other towns as yet untapped, and I feel sure many doctors, if only asked, would be pleased to accept this position, thus ensuring increased personal service and interest all over the country.

I conclude with a practical suggestion. Scores of medical luncheons and dinners take place annually. An appeal on behalf of the Fund at these functions would, in my opinion, not be misplaced, and would always meet with a sympathetic reception. Many new subscribers would thereby be obtained and the amenities of the social gathering would be enhanced by the knowledge that a deserving charity had not been forgotten.

I render an account of my own stewardship annually at our medical dinner, and each year brings in a fresh subscriber or two, which encourages me to continue my self-imposed and pleasant task.—I am, etc.,

August 20th. HOWARD DISTIN.

ANTLERS AND BONE GROWTH.

SIR,—I have just read the leading article upon Sir William Macewen's address on "Antlers and bone growth" in your issue of July 21st.

Although I cannot lay claim to an extensive knowledge of the wide problems of human origin and variation, I have done my best to guard against the myopia but too readily induced by the contemplation of minute and specialized questions. I have, I trust, succeeded to the extent of being able to subscribe to your words:

> "The doctrine he inculcates has a very important bearing, not only on surgical pathology, but also on physiology and histological anatomy. Those who are working in the special fields of reparative and (as they hope) constructive surgery stand in need of these gentle reminders. They will show their worth by the manner in which they respond."

Every doctrine must be supported by sufficient evidence, otherwise it is no more than an expression of opinion. What is Sir William Macewen's evidence, in so far as it concerns my own minute and specialized subject of histological anatomy? He has produced none, actual or theoretical, that the heterotopic bone in the pathological lesions he has described does not owe its existence to the activity of the fibroblasts of the granulation tissue *in situ*. Sir William Macewen's "thousand memories of the atoms comprising each osteoblast" are merely a restatement in picturesque language of the fact that osteoblasts give rise to bone. They are based upon the assumption that a preformationist doctrine of development and growth is true. If we do not accept this doctrine they lose their meaning. I cannot see that Sir William Macewen has brought forward

arguments to disprove the opinion that "all forms of mesoblastic tissue are interconvertible," or that every fibroblast in the body, if subjected to a suitable environment, will and indeed must assume the functions and therefore the structure of an osteoblast. Nor does he help us to an understanding of how the first osteoblast arose in the animal series. His paper has done nothing to upset my belief in an epigenetic mechanism of growth.

It does not matter in the least whether Sir William Macewen or I be right or wrong in our interpretation of development and growth. All that really matters is a better knowledge of the truth. This is, in my opinion, the real importance of the doctrine inculcated by him. Its true purpose will have been served only if it incites us to further research and thought. Will we, who work in special fields, show our worth by accepting the doctrines laid down by any man or number of men, however great they be, when we are convinced that they are wrong, because every fact known to us in our small corner of knowledge cries out against their acceptance? This is the course you advise us to adopt in your leading article, or so I read it. I vigorously, though humbly, protest against it.—I am, etc.,

Guy's Hospital, S.E., Aug. 18th. G. W. NICHOLSON.

MEDICAL MAGISTRATES.

SIR,—Dr. Tyson has expressed in better language than I can the opinion I have held for some time past, and put forward in vain. But I would go further, and suggest that whenever possible a medical man with experience in lunacy or mental deficiency should be given a seat on a magisterial bench. By such means a considerable number of mental deficients would be enabled to receive appropriate treatment, and also relieve magisterial courts of many constantly recurring cases.—I am, etc.,

HUBERT C. BRISTOWE, M.D.Lond.

Wrington, Somerset, Aug. 20th.

SIR,—I am pleased to notice in the current issue of the JOURNAL a correspondent emphasizes the importance and desirability of having more medical men on the magisterial bench. There are many cases, such as bastardy claims, where the knowledge and experience of a medical man are most useful in helping to sift the evidence and in coming to a just decision.

At quarter sessions many years ago a man charged with a serious crime, who was an epileptic and had had a seizure previous to the commission of the crime, was found guilty and was about to be sentenced, when I was able to point out to the chairman that some of the most atrocious and motiveless crimes are committed in the dull and half-stupid condition following an epileptic fit. The chairman was glad to have the information, and although the question of responsibility had not been referred to in the evidence, the prisoner was discharged.—I am, etc.,

Winsford, Cheshire, Aug. 20th. G. OKELL.

ORAL HYGIENE.

SIR,—I have come to the conclusion that dental caries, pyorrhoea, gastric pollution, appendicitis, and organic decomposition in general is caused by the inane daily scrubbing of teeth with bristles and by the insane use of chemical dentifrices, both of which lacerate and mortify living tissue, destroy epithelial defence, and provide a ready entrance for hostile germs. I earnestly invite attention to the handicap this kind of thing imposes on the natural disinfectants—saliva and mucus.

In ventilating this opinion I do not wish it to be inferred that I disapprove of cleansing the teeth. On the contrary, gentle rubbing with a soft (that is, badger hair) brush and some ordinary soda or other potable mineral water—milk and soda water with a final rinse of the latter to remove taste of milk is also a soothing combination—are procedures which I strongly recommend.

Any brushing of the gums or inside of cheeks I consider an insult to the natural scavengers and any artificial meddling with their job is as insensate as it is destructive.

People from time to time inform me that they use hard brushes in order to clear out foodstuff which becomes impacted between the teeth; to this I invariably reply: the same object can be effected much more accurately by the gentle precise employment of a tooth-pick—which, by the way, is (as far as I can gather) employed universally without discrimination of colour—white, black, and yellow. I am informed by many who have travelled much more than I have done that a tooth-pick in some form or other has general application, and that the most beautiful and healthy teeth may be seen in those who never saw (much less used) a tooth-brush. If I am correctly informed on these matters I can only conclude that in our white races our teeth become the victims of what is to them a superfine civilization.

Frequently patients have asked me what they can substitute for soda or mineral water, which is not always available. In such cases, for many years past, I have recommended a saltspoonful of sodium bicarbonate to the tooth-tumbler of boiled or filtered water. I do not prohibit the use of well diluted milk of magnesia in those who find it particularly agreeable, and I prescribe its employment in those undergoing mercurial treatment. Under all conditions, I emphasize the words "soft brush and gentle rubbing" with the injunction, "Confine these to your teeth. Do not put anything into your mouth that you would be ashamed to put into your stomach—don't smash up your gums."—I am, etc.,

Buenos Aires. JOHN O'CONOR, K.B.E., M.D.

FREEDOM OF NEGRO RACES FROM CANCER.

SIR,—In your issue of June 30th, 1923 (p. 1116) appears a letter from Dr. F. P. Fouché, in which he states that during his six and a half years of practice in the Orange Free State he had never seen, *inter alia*, a case of appendicitis, or of cancer in any form, in a native. The implication is conveyed, I think, that cancer and appendicitis are, if not unknown, at least exceedingly rare, among the natives of South Africa.

As a matter of fact, although these diseases—so far as one can gather—occur rather infrequently among natives they are not at all in the nature of pathological curiosities nor even strikingly infrequent, certainly not unknown. In a series of one hundred consecutive necropsies on native mine labourers conducted by myself in the latter part of 1922 and the first two months of 1923, two cases of carcinoma were observed—one was carcinoma of the pancreas and glands of the neck in a native male of the Shangaan race, age about 40, the other was a case of carcinoma involving practically the whole of the liver, in a native male of the same race, age about 25.

Dr. Pirie, of the South African Institute for Medical Research, has published several cases of carcinoma in natives.

The vast majority of the natives employed on the mines are between 25 and 40 years of age, and undergo at least two, and frequently three, medical examinations before engagement. Their average stay on the mines is about six months. Under such circumstances one would hardly expect to see many cases of carcinoma even among Europeans, yet we had two cases in only one hundred consecutive deaths in a native population averaging about 80,000.

With regard to appendicitis; at the symposium on "Acute Abdomens" held by the Transvaal Mine Medical Officers' Association in March, 1923, and published in the *Proceedings* for the same month, a number of cases of appendicitis were mentioned. Thus on a mine employing some four to five thousand natives, two cases were operated on in 1921, and three cases in 1923. On one of the mines of our group there were recently three cases within a few weeks.—I am, etc.,

A. J. ORENSTEIN, M.D.,
Superintendent of Sanitation, Rand Mines, Limited.

Johannesburg, July 27th.

THE TREATMENT OF TUBERCULOSIS.

SIR,—I should like the opportunity of supporting Dr. Goodwin's views on the treatment of tuberculosis (Aug. 4th, p. 206), though I think the elements of success must be coupled in this order: food and rest; fresh air and sunlight; and another added—that of shelter.

With regard to rest the ideal is rest in fresh air (not fresh air with exertion); in other words, rest of the joints

splinting, and rest of the lung by the horizontal position, and by breathing only sufficiently to exist. Rest of mind is equally important, and I have known an improving patient go back and die after receiving bad news. Children do better than adults as they will submit to discipline, they are unconscious of their danger, and have no worry.

Food should be fresh, and the ideal site is upon a farm where the medical superintendent can have charge of the milk supply.

The best air is that of the moors in September with a trace of frost in it. But damp and foggy air should be excluded, and only sufficient ventilation allowed to keep the atmosphere of the ward from becoming stuffy. If exposed to fog and damp, the patient has to fight both disease and environment, and the proper treatment of tuberculosis is tonic all the time. One of the best forms of rest in fresh air is a ride in a motor car on a dustless track, and some of the money spent on elaborate buildings might be better diverted to this form of treatment. Again, change of air is most desirable. And in my opinion (given sanatoriums under equal supervision) a patient should hardly stay longer than six months at one sanatorium. If a dozen children's sanatoriums were established in different parts of England, and the children (that is, pulmonary cases) moved every three or six months, I believe that such changes of air would shorten the two years' cure by at least six months.

With regard to sunlight, I have previously pointed out in the BRITISH MEDICAL JOURNAL that it is the morning and the evening sunlight which is tonic, whilst the midday heat is depressing, and that sanatorium wards (with double verandahs) should run north and south, as this provides sun and air baths at the proper times—whilst the ward itself gives shelter (another important factor) from the midday heat. Shelter from wind is also essential, and the two verandahs give shelter from the east and west as is found desirable.

Given early diagnosis (and pulmonary diagnosis is the most important of anything in medicine or surgery) the above conditions would, I believe, give the best results in Nature's treatment of tuberculosis.—I am, etc.,

Newcastle-upon-Tyne, Aug. 11th. T. M. ALLISON.

ETHER *VERSUS* CHLOROFORM.

SIR,—I have been reading the correspondence in your columns, "Ether *versus* chloroform," with interest. I must say I agree with Dr. Samways, and cannot understand why chloroform is such a bugbear at home. During twenty years' service in India I have never used, or seen used, any other general anaesthetic. I have never seen any deaths on the table from chloroform, although often the anaesthetic has been given by dressers and compounders.

I have, however, had two deaths from delayed chloroform poisoning; both of these were children about six years of age to whom chloroform had been given for over two hours. They were both cases of extensive tuberculous glands on both sides of the neck, and I was tempted to do both sides at once, as it is very difficult to get Indian patients to turn up for a second operation.

I know that other medical men in this country will corroborate my statements. Perhaps some will say that this is due to the fact that in a hot climate the chloroform evaporates quickly, and therefore the vapour is not so concentrated. Granted; but that does not apply to the cold weather in the Punjab, where the climate approximates to that of England, and is often in December and January quite cold.

Personally I should never dream of using ether, not that I have no experience of it, as I, when a house-surgeon at Guy's, used it extensively; but open ether would be out of the question in the hot weather; and the closed apparatus is complicated and cumbersome, and would rapidly become unserviceable, as all rubber goods deteriorate rapidly in this country. The only other anaesthetic I am using at present is spinal anaesthesia, which I find very useful for operations on the rectum, such as for haemorrhoids, where full relaxation is required.—I am, etc.,

July 26th. H. C. KEATES, Lieut.-Col. I.M.S.,
Civil Surgeon, Amritsar.

Obituary.

R. C. ACKLAND, C.B.E., M.R.C.S., L.D.S.,
Dental Surgeon, St. Bartholomew's Hospital.

MR. ROBERT CRAIG ACKLAND, who died on August 6th, came of an old Devonshire family, and was born in Exeter in 1865. His father died when he was quite young, and he always attributed any success he had attained to the inspiration and influence of his mother. He was educated at Exeter and Torquay, and after passing his preliminary examination proceeded to London, entering at Charing Cross Hospital and the Royal Dental Hospital; at the former, in addition to the medal in anatomy, he obtained distinction in several subjects. He took the L.D.S.Eng. in 1887, and the M.R.C.S. and L.R.C.P.Lond. in 1890, and settled in town. Soon afterwards he obtained the appointment of assistant dental surgeon to St. Bartholomew's Hospital, and became senior dental surgeon many years ago.

During the war he was appointed medical officer in charge of the Red Cross Hospital for Facial Injuries in Grosvenor Square, and this, in addition to his large practice in Brook Street, made inroads upon his strength, and his health gave way under the strain. He received the C.B.E. for his services. He was joint author of "Diseases of the teeth" in *Quain's Dictionary of Medicine*, and wrote several articles on dental surgery in textbooks and periodicals. A splint he introduced for the treatment of fractures of the lower jaw in 1893 is still largely used, and was of great service during the war. He married a daughter of Edmund Macrory, K.C., formerly treasurer of the Middle Temple, by whom he had two daughters. The large attendance at the Church of St. Bartholomew the Great on the occasion of his funeral bore testimony to the affection and regard in which he was held by his colleagues and his many friends. His body was cremated at Golders Green, and the ashes deposited in the churchyard overlooking the sea at Winterton in Norfolk, close by his house there.

R. C. Ackland was one of five brothers, all medical men and all practising dental surgery. His brothers are J. M. Ackland practising at Exeter, W. R. Ackland at Clifton, C. H. Ackland at Bournemouth, and D. Ackland at Bath. This record probably has no parallel.

We are indebted to Sir CHARLES GORDON-WATSON for the following appreciation:

Ackland came to St. Bartholomew's Hospital in 1891 as assistant dental surgeon after serving as demonstrator of anatomy at Charing Cross. In these early days, when he taught the dressers the art of extraction in most kindly fashion, I made his acquaintance—an acquaintanceship which ripened into a friendship of close on thirty years. It was a very precious friendship, for he was a very lovable man. Ackland possessed a magnetism, compounded of good looks, boyish gaiety, and generous instincts. Modestly and unobtrusively he was always doing somebody a good turn. He served St. Bartholomew's for thirty-two years, and there must be many Bart's men and many Bart's patients who will lament his death. For he had that sympathetic touch which attracted and endeared him to those with whom he came into close contact. Ackland was at his very best when entertaining at his house in Brook Street. His friends loved to dine there; he was such good company, such a good raconteur. In the outdoor life which he loved his boyish exuberance was always to the fore. He was a good shot and a keen motorist, when motors were in their infancy. Whether shooting, playing golf, or driving a car, his consideration for the other fellow stood out as an example to many. Those who were privileged to know him in his happy home life, away from the worries of work, in his delightful Norfolk home by the sea, could know the inner depths of the man. Ackland was not content to follow the beaten path in dental surgery. He was one of the first in this country to realize the great importance of dental sepsis in relation to general ill health. His pioneer work is now fully accepted, and there are many who, after enduring years of unsuccessful treatment,

now owe to him a debt of gratitude for health restored. The war came, and for him the call was strong. Like many another he gave his untiring best in splendid but exacting home service. At the beginning of the war he took an active part in organizing the Duchess of Westminster's Hospital, and served for a short time with the hospital in France. Later he organized and commanded, under the British Red Cross Society, a special hospital for injuries to the jaw—the first of its kind in the country. Here he worked with indefatigable energy, and for his services he received the C.B.E. at the end of the war. In this work he gave of his best gladly, lovingly, and unsparingly, for above all he loved his fellow man—but he paid the price. Never very robust, he emerged from the war a tired man. He surely needed a long rest, but was soon engulfed once more in the strain of a large practice. The inevitable happened. His friends became anxious. Alas! persuasion to take a long rest came too late, and the end came with tragic suddenness.

J. EDGAR P. DAVIES, M.B., B.Sc., M.R.C.S., L.R.C.P., Llanelly.

DR. EDGAR DAVIES, who was well known in South Wales as an able and hardworking practitioner and a most active member of the British Medical Association, passed away on August 1st in his 54th year. He had retired from practice owing to illness in 1918, and since then had shown a brave and determined spirit in his patient struggle to regain health. He was educated at Llandovery College and the University College of Wales at Aberystwyth. On entering St. Mary's Hospital he was awarded an entrance scholarship in science, and in the early part of his career there passed B.Sc.Lond. and the intermediate M.B. with honours in chemistry and physiology. He held the post of demonstrator in the physiological laboratory, and later, after obtaining the M.B. degree, was appointed house-physician under Dr. Sydney Phillips.

In 1897 Dr. Davies settled in Llanelly, succeeding to a large practice in an industrial area, and became a member of the honorary staff at the Llanelly Hospital. In his work he soon gave proof of the thoroughness of his early training and the richness of his natural gifts. He was an acute and careful clinical observer, shrewd in his deductions, and self-confident and not easily shaken once he had come to a decision. He was a very capable operating surgeon. Dr. Davies was a most conscientious worker, held high ideals of professional duties and responsibilities, and never thought any sacrifice too great for the sake of his patients. No doctor was held in higher esteem for his skill and devoted services. To his fellow practitioners he was loyal and helpful, and was frequently called by them into consultation.

Dr. Davies took a deep interest in medical politics. He acted as secretary to the South-West Wales Division of the British Medical Association for many years, and was its first representative at the Annual Meetings of the Association. He took an active part in the work of the Carmarthen Panel Committee, was a member of the Insurance Acts Committee of the British Medical Association, and for some time of the National Health Advisory Committee. All this committee work—in addition to the duties of a large practice—was done by one never in robust health and is an indication of the energy and enthusiasm he devoted to his profession. Dr. Davies was a staunch temperance advocate and was a devout and sincerely religious man. He held the office of deacon of the English Presbyterian Church, Llanelly.

We regret to record the death at Lewes, Sussex, on August 10th, of Dr. JOHN ROBERT STENHOUSE, aged 52 years. Dr. Stenhouse received his medical education at Guy's Hospital, and took the diplomas of M.R.C.S.Eng. and L.R.C.P.Lond. in 1894; he graduated M.B., B.S.Lond. in 1895 and M.D. (qualified for gold medal) in 1907; in 1904 he took the D.P.H. He held the posts of resident obstetrician and house-surgeon at Guy's Hospital, and clinical assistant at the Royal Ophthalmic Hospital, Southwark. Dr. Stenhouse started practice in Lewes in 1897, and was honorary surgeon to the Victoria Hospital there. He was at the height of his success when the war broke out, and as a surgeon lieutenant in the Sussex Yeomanry he was mobilized early in August, 1914. He never returned to his home until he came back from France in 1918, shattered in mind and body. In Lewes, where he was medical officer of health and school medical officer, he will long be remembered for his work in the prevention of infantile mortality, and for the object-lesson he set on the treatment of pulmonary tuberculosis in his private sanatorium on the Downs. As a physician he was remarkable for his accuracy in diagnosis and for the unremitting care he bestowed on his patients. Among his fellow officers in the war he will be remembered particularly for his gallantry and devotion on the night of the heaviest raid at Étaples in May, 1918, when he organized and led a body of volunteers, who rescued many men from burning huts when rescue seemed impossible and official attempts at it had ceased. Stenhouse was known also as an athlete and keen sportsman; in his student days he won trophies at Guy's. He was a member of the Lewes Priory Cricket Club and of the Southdown Hunt. He leaves a widow, two sons, and a married daughter.

We regret to record the death, on June 28th, of Dr. HERMANN MICHAEL BIGGS, State Commissioner of Health for New York, at the age of 63. He received his medical education at Bellevue Hospital Medical College, and qualified in 1883. In 1885 he was appointed professor of pathological anatomy at his college, in 1897 professor of therapeutics and clinical medicine, and in 1914 professor of medicine. He was director of the bacteriological laboratories of the New York Department of Health from 1892 to 1901, and general medical officer from 1901 to 1914, when he was appointed State Commissioner of Health. He had been a director of the Rockefeller Institute of Medical Research since its organization in 1901. Dr. Biggs was a member of the British Medical Association, and a Fellow of the New York Academy of Medicine. At the Annual Meeting of the British Medical Association held at Montreal in 1897 he delivered the address in public medicine, taking as his subject "Preventive medicine in the City of New York." In this he discussed some of the measures more particularly distinguishing the work of his department and described some of the procedures followed in the sanitary surveillance of infectious diseases which had been introduced by it. He took the occasion to pay a warm tribute to the leading part taken by England in the matter of public health. The address was printed in full in the BRITISH MEDICAL JOURNAL of September 11th, 1897 (p. 629). During the war he was nominated as a member of many important American committees in connexion with war organizations, and he was medical director of the League of Red Cross Societies at Geneva in 1920. His name will long be remembered for his pioneer work in the establishment of municipal bacteriological laboratories.

Dr. EDWARD R. HOLBOROW of Weston-super-Mare lost his life on August 18th in endeavouring to rescue two school-girls who had got into difficulties while bathing in a rough sea. He had dived into the water fully dressed. Dr. Holborow, who was only 37 years of age, received his medical education at the University College, Bristol, and University College, London, and graduated M.B., B.S.Lond. in 1908, taking the diploma of F.R.C.S.Eng. in 1917. Before settling at Weston-super-Mare he had served as house-surgeon to the Cardiff Infirmary, the Somerset Hospital, Cape Town, and the Pretoria Hospital, Transvaal. He served at Gallipoli during the war. He is survived by his widow and two young children, with whom deep sympathy is felt.

Dr. WILLIAM STUART ARMITAGE died at Pembroke on July 31st, aged 55. In early life he served for a short time in the Royal Artillery, and held a commission as lieutenant in the Reserve (R.F.A.) from July 21st, 1886. As such he served in West Africa in 1898. After going through the medical curriculum at St. George's, he took the diploma of M.R.C.S.Eng. and L.R.C.P.Lond. in 1913, at the age of 45. During the recent war he rejoined the Royal Field Artillery as lieutenant on August 29th, 1914, and was subsequently promoted to captain.

Universities and Colleges.

UNIVERSITY OF CAMBRIDGE.

IN accordance with a Grace approved by the Senate on June 8th, 1923, confirming a report of the Special Board for Medicine, important changes in the regulations for medical and surgical degrees will come into force in October next. Copies of the regulations and schedules may be obtained from the Registrary of the University. The main features of the new regulations will be noted in the section on the University of Cambridge in the annual Educational Number of the BRITISH MEDICAL JOURNAL, published next week.

The following candidates have been approved at the examination indicated:

Diploma in Tropical Medicine and Hygiene.—R. A. Anderson, J. M. Ghosh, M. R. Goverdhan, K. K. Shenai, J. H. Spencer, K. S. Thakur, F. R. Thornton.

UNIVERSITY OF LONDON.

UNIVERSITY COLLEGE.

THE Epsom Scholarship tenable in the Faculty of Medical Sciences has been awarded to Mr. G. G. Gillam.

The Services.

MEDICAL DIRECTOR-GENERAL, R.N.

SURGEON REAR-ADMIRAL JOSEPH CHAMBERS, C.B., C.M.G., has been selected for the post of Medical Director-General, R.N., and will take up office on October 1st. He is succeeded as officer in charge of the Royal Naval Hospital, Plymouth, by Surgeon Rear-Admiral Arthur Gaskell, C.B., O.B.E.

K.C.V.O.

THE King has been pleased to promote Surgeon Captain A. R. Bankart, C.V.O., R.N., to be a Knight Commander of the Royal Victorian Order.

DEATHS IN THE SERVICES.

Lieut.-Colonel James Edward Carter, R.A.M.C. (retired), died of septic poisoning at Machynleth, North Wales, on July 27th, aged 58. He was born at Loughaily, Armagh, on April 23rd, 1865, the son of the late Rev. H. B. Carter, D.D., of Derryloran, Cookstown, Tyrone, and was educated at Trinity College, Dublin, where he graduated M.B., B.Ch., and B.A.O. in 1889; he took the D.P.H. in 1902. Entering the army as surgeon on January 31st, 1901, he became major on December 2nd, 1905, and retired on December 2nd, 1913. He was recalled to the active list for service in the late war on August 5th, 1914, and promoted to lieutenant-colonel on May 25th, 1919. He also served in the South African war in 1899-1900, and took part in the advance on Kimberley, including the actions at Modder River and Magersfontein, and in the operations in the Orange Free State, including the ten-day action of Paardeberg, February 17th to 28th, 1900, in which he was severely wounded; and received the Queen's medal with two clasps.

Major William MacDowall MacDowall, R.A.M.C., died suddenly at Middlesbrough, Yorkshire, on board the British India s.s. *Mandala*, on June 22nd, aged 51. He was the only son of James MacDowall, Esq., of Crouch End; he was educated at the London Hospital, and took the diplomas of M.R.C.S. and L.R.C.P. Lond. in 1901. After serving as surgeon on the Natal Direct line of steamers, and as assistant medical officer at Hoxton House Asylum, he entered the R.A.M.C. as lieutenant on August 31st, 1903, and became major on February 28th, 1915. He served in the recent great war, and acted as lieutenant-colonel from April, 1917, to August, 1919.

Medical News.

THE annual Westminster Hospital old students' dinner will be held on Thursday, October 4th, at the Empire Rooms, Trocadero Restaurant, Piccadilly, W. Mr. W. G. Spencer will be in the chair. The honorary secretary is Dr. Adolphe Abrahams, 17, Harley Street.

PROFESSOR CIRO CALDERA has been appointed to the chair of oto-rhino-laryngology in the University of Pavia.

POST-GRADUATE courses on dermatology and venereal diseases will be held in Paris at the museum of the St. Louis Hospital and the amphitheatre of the clinic, 40, Rue Bichat; the course on dermatology will commence on October 5th, and that on venereology on November 14th. The courses will be conducted under the direction of Professor Jeanselme, with the co-operation of Professor Sébileau, Dr. Gougerot, Dr. Sabouraud, and others. The fee for each course is 150 francs. A detailed programme will be sent on request.

THE Spanish Congress of Pediatrics will be held at San Sebastian from September 2nd to 7th, under the presidency of Dr. Arquellada.

THE famous histologist, Professor Camillo Golgi of Pavia, has recently celebrated his 80th birthday.

THE twenty-ninth congress of the Italian Society of Internal Medicine will be held in Rome, under the presidency of Professor V. Ascoli, from October 24th to 26th, when the following subjects will be discussed: (1) Diabetes insipidus, introduced by Professor Ascoli Maurizio; (2) cholelithiasis, with special reference to pancreatitis and infection of the bile ducts, introduced by Professor Schupfer Ferrucio (conjoint meeting with Italian Society of Surgery); (3) progress in diagnosis and treatment of heart disease, introduced by Professor Barlocco Amerigo. Further information can be obtained from the secretary of the congress, Professor Giuseppe Sabatini, Clinica Medica, Policlinico Umberto 1, Rome.

THE Board of Trade's referee has ruled that formaldehyde be excluded from the list of articles chargeable with duty under Part I of the Safeguarding of Industries Act.

THE thirtieth congress of the Italian Society of Surgery will be held in Rome from October 24th to 26th, when the following subjects will be discussed: (1) Infections of the gall bladder, with special reference to pancreatitis, introduced by Professor Muscatello. (2) Infections of the large bile ducts, introduced by Professor Crosti. (3) Grafting in general, including skin grafts, introduced by Professor Fasiano. (4) Nerve grafts, introduced by Professor Chiasserini. Further information can be obtained from the secretary of the congress, Professor Leonardo Dominici, Clinica Chirurgica, Policlinico Umberto 1, Rome.

THE Health Commissioner of Chicago has refused to license a parents' clinic for the purpose of giving information concerning the control of conception. The mayor, on appeal, refused to interfere with the Health Commissioner's decision, and the whole question has been submitted to the corporation counsel for a legal opinion.

THE second congress of the Italian Society of Urology will be held in Rome on October 27th, when the following subjects will be discussed: (1) Functional examination of the kidneys, introduced by Professors Pirondini and Raimoldi. (2) Roentgenotherapy in urology, introduced by Professors Busi and Bonamone. (3) Radiotherapy in urology, introduced by Professor Cassanello. Further information can be obtained from the secretary of the society, Professor Mingazzini, Clinica Chirurgica, Policlinico Umberto 1, Rome.

THE thirty-eighth annual report of the Trudeau Sanatorium, Saranac Lake, New York, records that 450 patients were treated last year, of whom 322 were discharged. The patients discharged were classified as follows: apparently arrested, 50 cases; disease quiescent, 155; disease improved, 29; unimproved or failed, 43; diagnosis doubtful (suspected tuberculosis), 22; cases found to be non-tuberculous, 21. Two patients died.

IN his annual report on the work of the Shanghai Public Health Department for 1922 Dr. C. Noel Davis, Commissioner of Public Health, records that the outbreak of small-pox which started in 1921 continued until the following April. The campaign of vaccination was carried on with great vigour, and the effect began to be seen early in the year, when the outbreak waned, and only a few sporadic cases occurred after the end of March.

A REPORT on plague in Egypt during the year 1922 has been issued by the Department of Public Health of the Ministry of the Interior. The total number of cases of plague was 487, including 25 foreigners; the deaths numbered 228, including those of 15 foreigners. The cases and deaths were distributed fairly evenly between Lower Egypt and Upper Egypt.

THE eleventh annual report of the medical department of the United Fruit Company, issued from the general office of the company at Boston, Massachusetts, is a sumptuous publication of nearly 150 pages. In the course of his introductory letter Dr. W. E. Deeks records that in August, 1922, the United Fruit Company inaugurated a free medical wireless service and consultation with its hospitals and steamships and all ships at sea. The announcement of this service was translated into French, Spanish, and Portuguese, and distributed to merchant shipping throughout the world. It was established primarily for the benefit of ships not carrying doctors; but ship's surgeons may consult by wireless with the company's doctors, either aboard ship or ashore. Radiograms requesting medical advice have a special code prefix, and are given preference over all other messages except SOS calls through the wireless service of the United Fruit Company and its subsidiary companies.

THE *Times* of August 23rd states that the *Deutsche medizinische Wochenschrift*, the *Münchener medizinische Wochenschrift*, and the *Klinische Wochenschrift* have suspended publication owing to the exorbitant costs of production.

Letters, Notes, and Answers.

ORIGINAL ARTICLES and LETTERS *forwarded for publication are understood to be offered to the* BRITISH MEDICAL JOURNAL *alone unless the contrary be stated.*

CORRESPONDENTS who wish notice to be taken of their communications should authenticate them with their names—of course not necessarily for publication.

As, owing to printing difficulties, the JOURNAL *must be sent to press earlier than hitherto, it is essential that communications intended for the current issue should be received by the first post on Tuesday, and lengthy documents on Monday.*

AUTHORS desiring reprints of their articles published in the BRITISH MEDICAL JOURNAL are requested to communicate with the Office, 429, Strand, W.C.2, on receipt of proof.

IN order to avoid delay, it is particularly requested that ALL letters on the editorial business of the JOURNAL be addressed to the Editor at the Office of the JOURNAL.

THE postal address of the BRITISH MEDICAL ASSOCIATION and BRITISH MEDICAL JOURNAL is 429, Strand, London, W.C.2. The telegraphic addresses are:

1. EDITOR of the BRITISH MEDICAL JOURNAL, *Aitiology, Westrand, London;* telephone, 2630, Gerrard.
2. FINANCIAL SECRETARY AND BUSINESS MANAGER (Advertisements, etc.), *Articulate, Westrand, London;* telephone, 2630, Gerrard.
3. MEDICAL SECRETARY, *Mediscera, Westrand, London;* telephone, 2630, Gerrard. The address of the Irish Office of the British Medical Association is 16, South Frederick Street, Dublin (telegrams: *Bacillus, Dublin;* telephone, 4737, Dublin), and of the Scottish Office, 6, Rutland Square, Edinburgh (telegrams: *Associate, Edinburgh;* telephone, 4361, Central).

QUERIES AND ANSWERS.

HYPERTHYROIDISM.

"R. S."—Professor G. R. Murray's lecture on hyperthyroidism was published in our issue of June 10th, 1922 (p. 905). The latest literature on the subject is to be found in periodicals such as *Endocrinology* and the *Archives of Internal Medicine* (Chicago). Our correspondent might also refer to the recent volumes of the *Collected Papers of the Mayo Clinic* and to Nelson's loose-leaf *System of Medicine* (an American work), which keeps its original articles up to date by inserted pages; vol. iii contains a good deal about hyperthyroidism.

TECHNIQUE OF VACCINATION.

DR. C. W. J. BRASHER, Major R.A.M.C.(T.A.), ret. (Clifton, Bristol), writes: In your issue of August 11th (p. 268) Dr. D. W. Samways asks a number of questions of importance at the present time. My experience in a large military station during the war may be of interest. Several thousand recruits were vaccinated, and at first each man's arm was only washed with carbolic soap and boiled water, the arm being then dried with a sterile swab. In hot weather this preliminary treatment failed to prevent a large percentage of cases of severe cellulitis and prolonged suppuration. It was evident that something further was required to disinfect the deeper layers of the skin. The following technique was then adopted:

After the preliminary washing described above the arm was dried with methylated spirit, then painted with tr. iodi, which was allowed to dry. The arm was then washed with boiled water until only sufficient iodine to produce a pale lemon tinge remained. Vaccination at four points was done in all cases with an all-steel scarifier; excess of lymph was swabbed off in three minutes and a pad of boric lint applied and secured with a bandage.

Over 80 per cent. of cases treated thus healed without pustulation, which does not appear essential but rather to be a secondary infection due to the staphylococci of the skin. The fact that in the case of infants with healthy skins pustulation rarely occurs after vaccination appears to indicate that pustulation plays no part in the protective process. The swabbing off of the excess of lymph in three minutes did not prevent successful vaccination, and it seems to be advisable in order to prevent dust, etc., adhering to the dried lymph. A pad of boric lint or other antiseptic dressing protects the vesicle and allows it to dry up after maturation. If the lint adheres firmly to the scab it should be carefully cut away from the pad and the adherent portion covered with a fresh pad.

MASTICATION.

MR. HERBERT CAIGER, F.R.C.S. (Sheffield), writes: Horace Fletcher, concerning whose books, etc., a correspondent makes inquiry, published at least three books dealing with mastication, appetite, and digestion. In 1899 he published *The New Glutton or Epicure* (pp. 326). This is a curious medley, in which many converts contribute accounts of their experience. One striking passage describes how a "Fletcheriser" (probably H. F. himself), "squatting upon the floor of the room, passed into the hollow of his hand the contents of the rectum. This was done to demonstrate human normal cleanliness and inoffensiveness: neither stain, nor odour, remaining upon the hand"! In 1903 he published *The A, B-Z of our own Nutrition*, in which are reprinted at length Pawlow's lectures on the psychic factor, Cannon's articles on the mechanical factor, Harry Campbell's articles on mastication in the *Lancet* (1903), and shorter contributions from various writers (Michael Foster, Chittenden, and others). These form two-thirds of the book. Some years later, when 64 years of age, Fletcher published a smaller book entitled *Fletcherism—What it is; or, How I became Young at Sixty.* This is practically entirely his own work, and gives his best exposition of his experiences and conclusions. There is a good deal of repetition, especially in the earlier books, and their style is at times irritating to an English reader. But there is much of real interest to the physiologist, and financier too, as Chittenden and J. D. Rockefeller testify. The books are published by Ewart Seymour and Co., 12, Burleigh Street, Strand.

INCOME TAX.

"X. Y. Z." seeks information with regard to occasional earnings.

*** Occasional earnings as a medical man or a chemist are liable to tax, the test being whether the fees received accrue for services rendered. If, as appears to be the case, "X. Y. Z." does such work more or less habitually the earnings should be returned for assessment on the three years' average, and the question as to adjusting an estimated assessment at the end of the year does not arise.

"W. F. M." asks: Is it possible to get any abatement from income tax for money derived from a Government pension and insurance (panel) practice?

*** The usual personal allowances are obtainable unless, as is probably the case, they have been made in calculating the tax suffered; any expenses incurred in the performance of the duties can also be claimed on, unless allowed for in assessing the professional earnings.

LETTERS, NOTES, ETC.

A HEALTH ALMANACK.

THE enterprising Provincial Board of Health, Ontario, publishes a health almanack compiled by Dr. J. J. Middleton, Director of the Division of Public Health Education. The whole publication is couched in popular language and the contents range from hints on pre-natal care and notes on communicable diseases to directions for putting together a home-made fly-trap. The monthly calendar presents an odd jumble of health hints and more or less notable events. Here are a few examples: "March 15: Emperor Nicholas of Russia abdicated, 1917. March 16: Keep your body in good trim." "April 9: Canadians captured Vimy Ridge, 1917. April 10: Swat the early fly." "April 20: It's worry, not work, that kills. April 21: Mark Twain died, 1910." "May 29: Horatio Bottomley, M.P., gets seven years' imprisonment. May 30: Children need a long, quiet, unbroken sleep." "July 25: Mind poisons should be avoided. July 26: George Bernard Shaw born, 1856." We suspect that some of these strange juxtapositions are not entirely unintentional. The almanack closes with a series of health pictures for children intended to be cut out for the nursery scrapbook; the illustrations are for the most part better than the rhymes underneath them. On the inside cover of the almanack is a view of the imposing building in Toronto which houses the Provincial Board of Health.

THE Jaeger Company, Ltd. (95, Milton Street, E.C.2), have issued a new edition of their catalogue, of which the first edition appeared in 1884. The current catalogue is freely illustrated, and notes are included drawing attention to the precautions taken at the firm's laboratory to ensure purity of material.

VACANCIES.

NOTIFICATIONS of offices vacant in universities, medical colleges, and of vacant resident and other appointments at hospitals will be found at pages 29, 32, and 33 of our advertisement columns, and advertisements as to partnerships, assistantships, and locumtenencies at pages 30 and 31.

A short summary of vacant posts notified in the advertisement columns appears in the *Supplement* at page *116*.

SCALE OF CHARGES FOR ADVERTISEMENTS IN THE BRITISH MEDICAL JOURNAL.

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Six lines and under	0	9	0
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Whole single column (three columns to page) ...	7	10	0
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An average line contains six words.

All remittances by Post Office Orders must be made payable to the British Medical Association at the General Post Office, London. No responsibility will be accepted for any such remittance not so safeguarded.

Advertisements should be delivered, addressed to the Manager, Strand, London, W.C.2, not later than the first post on Tuesday preceding publication, and, if not paid for at the time, should be accompanied by a reference.

NOTE.—It is against the rules of the Post Office to receive *poste restante* letters addressed either in initials or numbers.